

IRON AGE

editorial

Good Judgment—Key for Defense

COMMUNISTIC arrogance, expansion and aggression caught us woefully weak in what only dictators understand—military strength. Now we are entering a period never before seen by the American people.

We are putting some of our liberties on ice while we and our friends hasten to make ourselves strong: strong enough to nip in the bud any attempt by Russia to ruin the free world.

We are mobilizing our people, our materials and our industries; and at the same time we are trying to keep our economy from cracking under the strain. We lack the rallying cry that pulls everyone together in an all-out war.

We don't want war but we don't want to wake up some day and find that, piecemeal, Russia and her slave nations have taken over. It is a new role for us: to make both guns and butter; face stiff taxation and restraints; give up the peaceful use of our machines and technical knowledge.

In this colossal effort we need the best brains, the best advice and the best judgment. Bad judgment could produce lasting damage to our democracy.

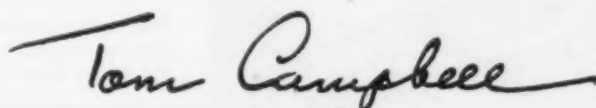
This is when we need cooperation, patience, speed, unselfishness and a real heartfelt patriotism. There is no time for politics for politics' sake; no time for business for business' sake. It is no season for making tin gods at the expense of our country.

Soon those who have dulled their eyes to what we are trying to do and deafened their ears to what we have been told must be done will get the surprise of their lives. The defense program is getting up steam. By the end of this year it will surpass anything we have seen since World War II—in production, in dislocations and in cost.

Our mobilization agencies will make mistakes; but these must be kept to a minimum. Their decisions will affect millions and may seriously affect our lives for years to come. They should heed the advisory committees they have named: they should accept with good faith the advice they get. Final action is their responsibility. It will be the heaviest they have faced in a lifetime.

Business and labor leaders have just as grave a responsibility. Fault finding should be constructive. Advice and criticism should be in the interest of the country and not for a special interest of their industry or labor group. If they think they are right, let them speak loud and often. When they find they are wrong let's have a quick right-about-face with no lost motion.

There is no time for dogmatic righteousness or petty stubbornness by business, labor or government. This is the time for the best judgment possible.



Editor

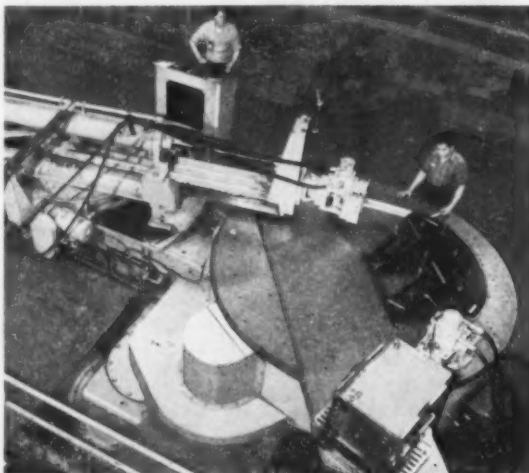
March 1, 1951

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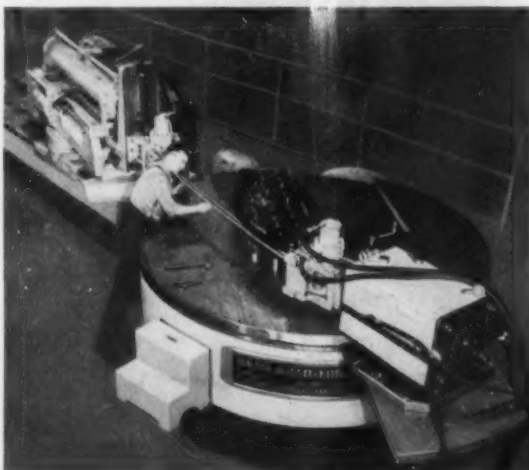
BATH the machine that SHEETS, EXTRUSIONS, TUBING



Above: Stretch-forming and twisting around a compound curve in a multiplicity of planes.



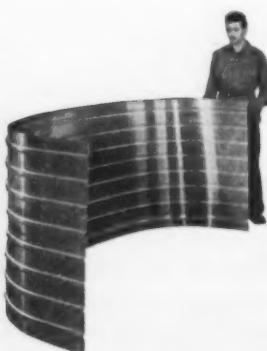
Showing finished stretch-forming after shaping and heat treating at Boeing. Pull in either direction is exerted by both ram and table cylinders.



Illustrating the tangent stretching principle on a light section at Boeing. Same machine will handle from 1,000-lb. to 100,000-lb. pull.



Aluminum gun turret rings accurately formed to complete circle.

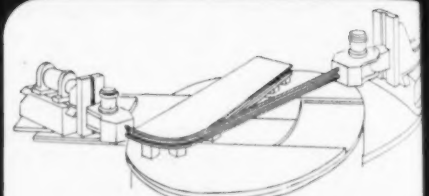


Large corrugated aluminum sheets accurately formed on the BATH machine.

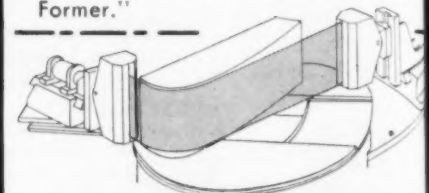
The BATH machine provides the 14 essentials of a UNIVERSAL Contour Former. It is the only machine that can form virtually all the shapes that will be required in future aircraft design.

Hundreds of shapes, with compound curves and varying radii in many planes are being formed on BATH exclusively because no other machine can produce them. Read the 14 essentials listed below and you will choose BATH—for only BATH provides them all.

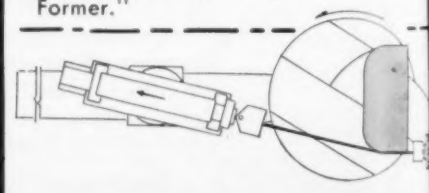
TYPICAL DIE SET-UPS



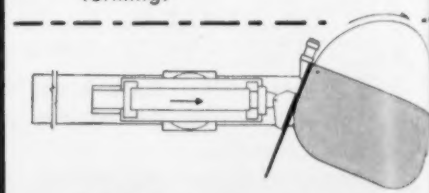
Tool arrangement for "Extrusion" work on "The BATH Universal Contour Former."



Tool arrangement for "Skin" work on "The BATH Universal Contour Former."



Typical die set-up for stretch forming.



Typical compression forming set-up.

THE CYRIL BATH

6940 MACHINERY AVENUE

IRON AGE *newsfront*

news

methods

and product

forecast

► The auto cutback will be a lot more serious and confusing than NPA apparently thinks. Smaller companies—by the hundreds—which supply the auto industry will be hurt first. Some have already been hit. The total effect depends on timing: If defense orders arrive as the cutback comes it won't be so bad. But indications now are there will be a period of vacuum between the two.

Even before that many suppliers to auto and appliance makers will lay off workers to avoid building up inventories of material that may not be used by their customers.

► Tests on solid aluminum bars for mold deoxidation to replace aluminum shot are under way by several steel producers. This method uses less aluminum per ton of steel treated than does the shot method—but some Washington action will be needed to assure steelmakers of aluminum rod supply.

► In the past few weeks four steel foundries have bought 22 million-v betatrons for high speed radiography of very heavy ordnance equipment. All four will be crane mounted.

► Three-dimensional color television won't be used in the home—at least not in the near future—because of cost and limited viewing angle. But it is already being used in industry and by the Atomic Energy Commission.

► Major ordering by the Dept. of Defense will hit in April or May. The critical period of program and ordering confusion will be the third quarter. By that time more than half the steel output will be going into direct and indirect defense items.

► As titanium melting furnaces become larger more titanium scrap will be used. The scrap metal-sponge ratios have already been worked out by at least one producer.

► Mond Nickel Co., British Inco affiliate, will prospect for nickel in Tanganyika. Some 1120 sq. miles will be covered by air detection methods.

► Steel companies are not expected to get as much plate production off strip mills as they did during the last war. Reason is that requirements on quality, size and finish are more rigid than they were during World War II. This means a further loss in steel shipments—in addition to the substantial difference between plate tonnage and strip tonnage from a strip mill.

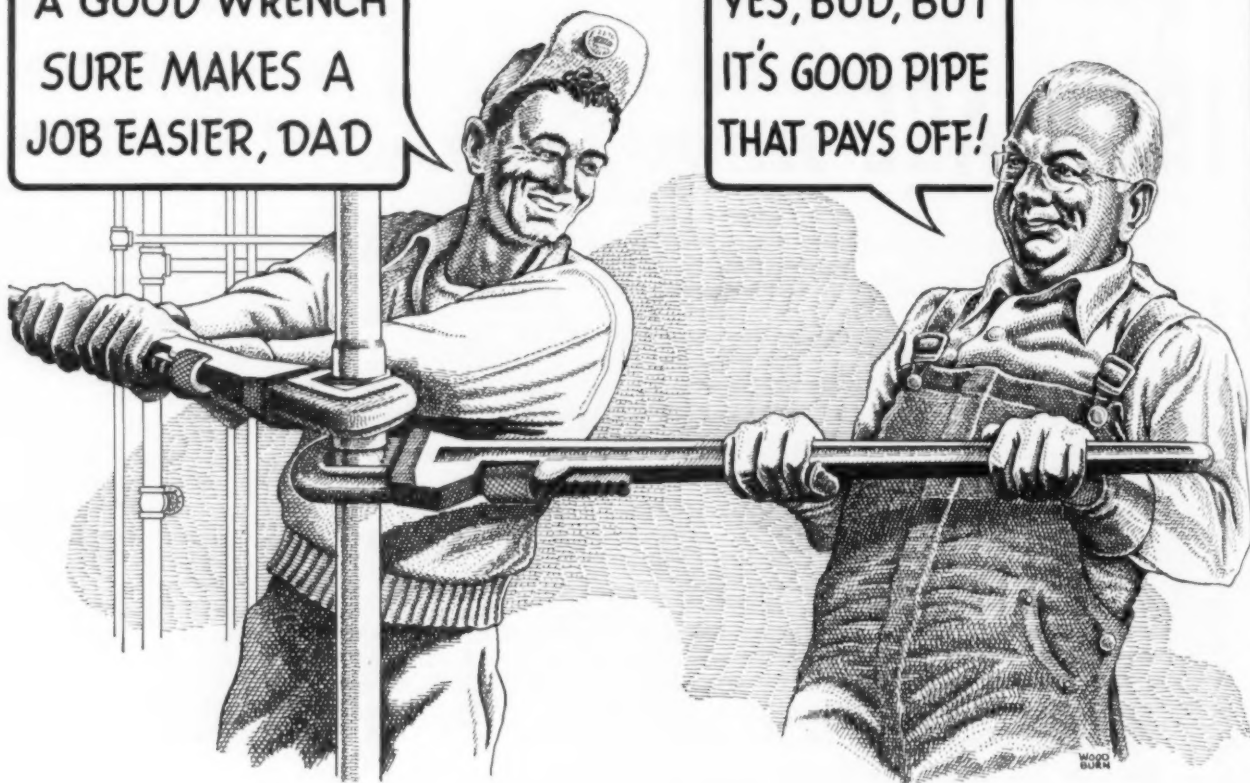
► The amount of metal that will be needed for the Army tank program will astonish even those who have been talking about how big the project will be. While tank production is now getting the needle all over the country it is not likely to cause much dislocation in industry even though the Army is putting pressure on to get plants tooled up to roll as quickly as possible.

► Steel ingots, which could be found without too much trouble 3 weeks*ago (if you knew the ropes) have now vanished from the market.

► Electrode life for ac-welding of aluminum has been increased by a method called "slope control." It prevents the usual high current surge at initial striking of the arc. Elimination of this surge practically eliminates all electrode pickup of aluminum.

A GOOD WRENCH
SURE MAKES A
JOB EASIER, DAD

YES, BUD, BUT
IT'S GOOD PIPE
THAT PAYS OFF!



Good plumber + good tools + GOOD PIPE = GOOD JOB!

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IN YOUNGSTOWN STEEL PIPE

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EVEN the hardest jobs are easier when you work with Youngstown pipe. That's because Youngstown pipe is consistently uniform - uniform in lengths, uniformly round and straight, uniformly threaded, uniformly soft and ductile, yet uniformly tough and strong. "Youngstown" rolled into every length is the sign of GOOD PIPE.



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IRON AGE *summary*

*iron and steel
industry trends*

Metal users facing critical test in third quarter . . . Alloy steel shortage seen acute . . . Steel output at 100 pct capacity

METAL users will face their most critical test during the third quarter of this year. Although some of them already have been curtailed by restrictions and frustrated by uncertainty, the worst is yet to come. The present timetable indicates that the full impact of the defense program will be felt during the third quarter. At the same time the newly launched controlled materials plan will be on its shakedown cruise.

Between now and the third quarter there will be many more control orders issued, as the situation demands. Few of these are expected to do much toward clarifying the future of the metal consumer. They are more likely to make him all the more confused.

Restrictions Outpace Defense Orders

This week there is a mild scramble among manufacturers striving to get defense orders which just don't exist. Although more and more defense orders are being placed, they obviously are not keeping pace with material restrictions placed on manufacturers. Some of the largest orders will require many months of tooling before they employ many workers and large plant facilities. Meanwhile, metalworking plants are being squeezed by lack of material for peacetime output and lack of orders for military output.

Few in industry now expect that the controlled materials plan will function smoothly in the beginning. But they do expect it to bring about a complete listing of defense and essential civilian needs. Once these needs are definitely known the metal fabricator will have a better idea of his chances of getting defense orders, as well as his prospects of getting material to make civilian goods.

The 20 pct cutback of steel use in autos and other consumer durable goods is regarded by some as so much "window dressing." Some steel

firms have already cut back these customers more than 20 pct. Bigger cutbacks are in store. Auto people indicate that they will keep making cars at top speed as long as their fast-shrinking inventories hold out.

This week a critical shortage of alloy steel is causing more grey hair in Detroit than the national Production Authority's cutback order. Heading the critical list are alloy bars. The alloy shortage is uniform among major producers. It indicates that defense business is already hitting some products hard.

Announce Steels to Save Alloys

This grave outlook was the subject of an emergency meeting of top-ranking metallurgists, alloy producers and consumers in Detroit last week. The meeting resulted in announcement of four new series of alloy steels. These new steels are designed to save critical alloys without sacrificing physical properties. It was indicated that their adoption on a tonnage basis would be gradual.

This week all types of steel products are more scarce than ever. Blooms, billets and slabs suitable for rerolling have practically disappeared from the market. There is no sign that major steel converters plan to relinquish any of their conversion arrangements unless the government directs them to do so.

Some Devote Half to Defense

The strongest pressure is still on structurals, plate and all flat-rolled steel products. Although the intensity of demand varies among producers and products, some steel companies are already assigning more than half their output of some of these items to defense and government-directed programs.

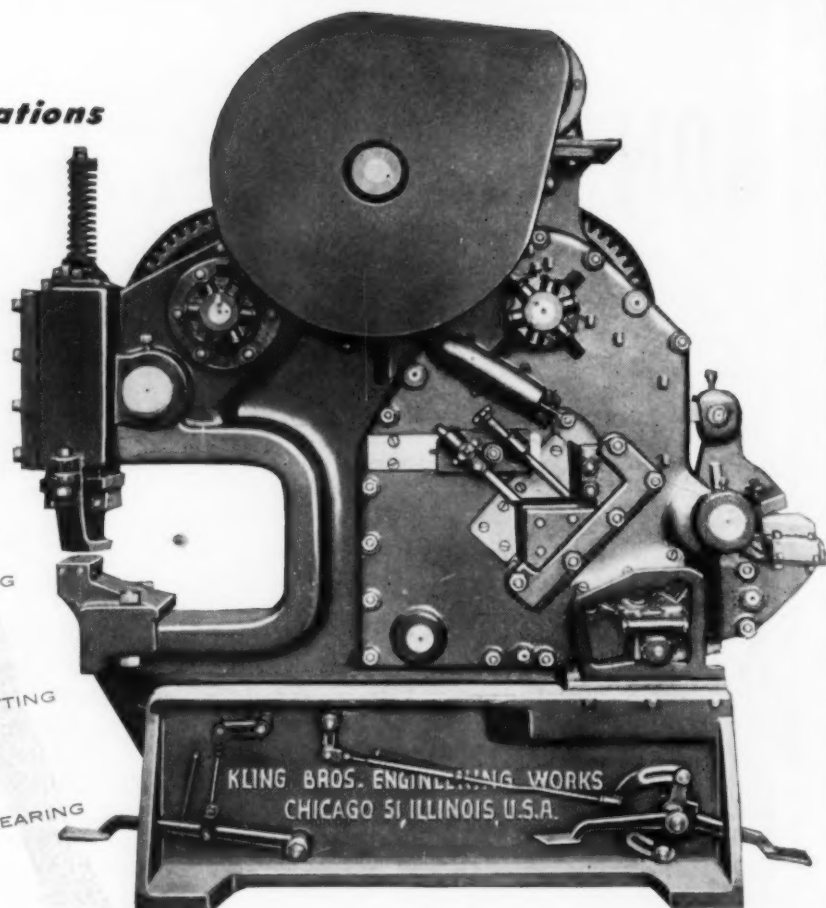
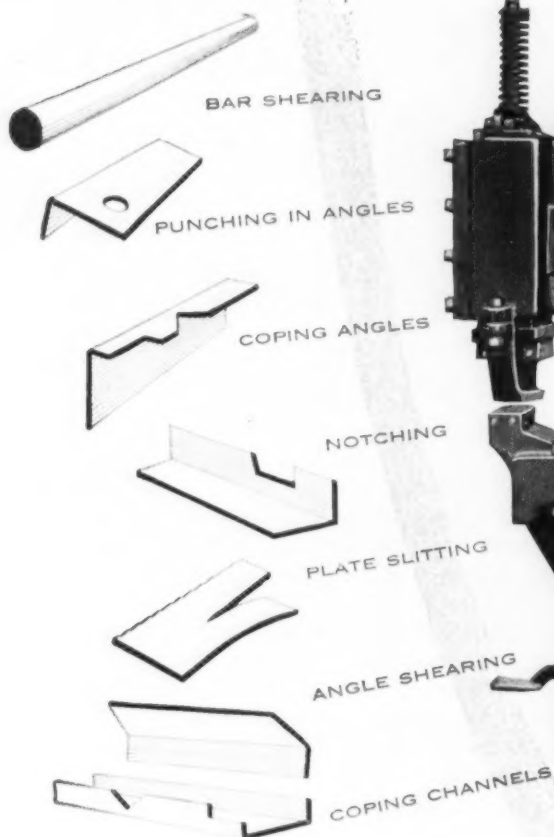
Steelmaking operations this week are scheduled at 100 pct of rated capacity, up ½ point from the previous week.

(nonferrous summary, p. 180)

March 1, 1951

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**seven typical jobs...
seven different operations**



all SEVEN done on... ONE

**KLING
COMBINATION
SHEAR, PUNCH
AND COPER**

Here are just seven of the many operations performed in one typical shop on *one* Kling combination Shear, Punch and Coper. If you do heavy metal fabricating work...volume production or an occasional maintenance job...you'll find many other ways this machine can save you money.

For example, *one* Kling Machine in your shop can turn out the work of a separate punch, angle shear, bar shear, plate shear, or notcher. And you get all this multiple machine production for only a few dollars more than the cost of a single-purpose punch.

The Kling Combination is a rugged, heavy-duty machine built to machine tool precision. Each end operates independent of the other for faster, safer operation. Foot pedals allow both operators to keep both hands free to hold work. Available in 3 sizes for light, medium or heavy work.

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Friction Saw



Double Angle Shears



Rotary Shears



Punches

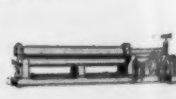


Plate Bending Rolls

Carilloy Steel...

harder—yet easier to fabricate

and cost 25% less!

SOMETIMES it costs less to use steel that costs more. Here's a case history to prove it.

Ensilage cutters and forage harvesters made by Papec Machine Company have long been regarded as tops in agricultural circles. The working heart of these machines are the cutter blades—and they really take a beating. When handling crops from stony fields, appalling amounts of stone along with wood, roots and bits of metal pass through the blades. To withstand abuse like this the blades *have* to be very tough indeed.

Papec formerly used a "laid-on" blade—a low carbon steel body with a high carbon cutting edge rolled on under high pressure and heat. These blades were good—but Papec wanted to make them better. So they called in our service metallurgist. Working closely with their engineers he finally found a way to greatly increase cutter blade durability. Now these vital parts are made of extra-tough, extra-hard alloy steel—heat-treated U·S·S CARILLOY 4150.

**Simplified fabrication with
U·S·S Carilloy 4150 cuts cost 25%**

CARILLOY 4150 is plenty tough inside. Therefore it can safely take shocks that would ruin a more brittle blade. But it's also extremely hard on the surface—to furnish a sharp cutting edge that *stays* sharp. In other words, U·S·S CARILLOY 4150 provides the ideal combination of toughness and hardness that prevents damaged blades and time-wasting shutdowns.

In this application, CARILLOY 4150 does more than make a better blade—it speeds up fabrica-

tion, too. Testing it against air-hardening tool steel, Papec engineers found that, after heat-treating, CARILLOY 4150 showed all-round better characteristics and held a keen edge longer. The steel was also much more *uniform*. This uniformity paid off in two ways: First, the heat-treated CARILLOY blades were *easier* to machine. Second, the blades were less distorted after heat treatment, so *less* machining was required. As a result, the CARILLOY blades not only were much cheaper than air-hardened tool steel, but actually cost 25% less than the old "laid-on" blades.

Whatever properties your product needs—strength, toughness, light-weight, or superior durability under trying conditions—service-tested U·S·S CARILLOY Steels can provide them. And quite often at lower cost.

United States Steel Company
Room 4246, Carnegie Building
Pittsburgh 30, Pa.

☐ Please send me your book on U·S·S Carilloy Steels.

Name.....

Company.....

Address.....

City and State.....

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NATIONAL TUBE COMPANY, PITTSBURGH • TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM

UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK



Carilloy Steels

ELECTRIC FURNACE OR OPEN HEARTH • COMPLETE PRODUCTION FACILITIES IN CHICAGO AND PITTSBURGH

UNITED STATES STEEL

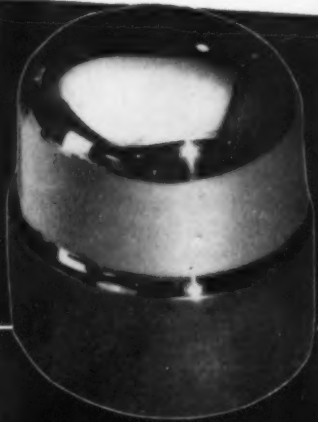
March 1, 1951

E-150

23

Now!

**A SURE WAY TO PRODUCE
MIRROR FINISHES, FASTER**



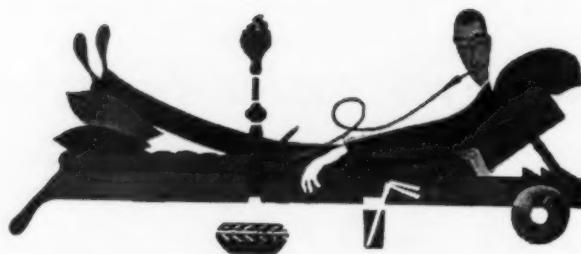
DYMO FINISHING

- ✓ PLASTIC MOLDS
- ✓ CARBIDES
- ✓ DRAWING DIES
- ✓ PRECISION PARTS
- ✓ CUTTING TOOLS

**TESTED AND PROVED BY
HUNDREDS OF INDUSTRIAL USERS!**

You can reduce finishing and polishing time in your shop—and get mirror finishes every time—with DYMO FINISHING. Elgin DYMO Diamond Compound . . . containing pure, Elgin graded diamond . . . comes ready to use, minimizes waste and cuts faster. Write today for free demonstration—proof of DYMO FINISHING advantages.

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ELGIN NATIONAL WATCH COMPANY
ELGIN, ILLINOIS**



Fatigue Cracks

by Charles T. Post

Copper Shortage

Ted Metaxas, your favorite family journal's alert news analyst, has a sure fire plan to remedy the copper shortage: Call in all the pennies in circulation. You won't need to issue any zinc substitutes this time, because, except for sales tax payments in some areas, the buying power of the penny has practically disappeared behind the horizon. Carrying the same line of thought a logical step further, our man Metaxas may even have a solution for the nickel shortage.

Bitter Lesson

W. S. Leech of G. M. Basford Co., the big industrial advertising agency, was good enough to send Publisher George Hook a clipping from the *Cleveland Plain Dealer* telling how your f.f.j. almost, but not quite, prevented Axis provocation that led to the U. S. entering World War II.

In 1941, Joachim von Ribbentrop, then German foreign minister, called in Ambassador Karl Ritter, chief of the economic division of the German foreign office. Von Ribbentrop held up to scorn the steel capacity of the U.S., contending its production figures were faked. But Ritter was not so sure.

"This is no bluff," he said, "because for 40 years I have read *THE IRON AGE*. Every economist in the world reads it, as it is an economic barometer. Do you believe, Mr. Foreign Minister, that they were lying during all these years, even before war?"

Ribbentrop was unconvinced and persisted in underestimating U.S. abilities. This is a tip to Vishinsky not to fall into the same error.

Puzzlers

Now we know why there were no takers for the ball problem in the January 18 issue. T. C. Francis, Bradford, Pa., tackled it and sent along his work sheets. He came up with the right answers, but how he got them is beyond us. Such equations! Chester Tyminski, Hazelett Strip Casting Process, sent us his correct solution to the cork cover puzzle.

A number of readers seemed to have found a street 40.4 ft wide and a ladder 41.6 ft long. J. A. Carson, Oklahoma City, J. J. O'Connor, Pressed Steel Tank Co., H. L. Hendley, Columbus, C. E. Blass, Talon, Inc., Edgard A. Schwab, New York City, and Max Cooperman, U. S. Gas Range Corp., were additional lucky winners on this problem.

At deadline time we have added 14 names to your f.f.j.'s honor roll of cryptographers on the February 15 puzzle: R. C. Gray, The Gray Wire Specialty Co., C. G. Heilman, Commonwealth Industries, Inc., T. A. Reeves, Reeves Steel & Mfg. Co., Miss Genevieve Tull, Henry Disston & Sons, J. J. Kulick, Great Lakes Steel Corp., A. W. Viner and Herbert Stein, Committee for Economic Development, Frank A. Daughn, Youngstown Sheet & Tube, Jack Musolino, Brooklyn, M. M. Cooledge, Buckeye Steel Castings Co., R. G. Bradyhouse, Jr., Baltimore, W. G. Holmes, Detroit Technical Service, Richard Dynner, Marathon Foundry & Machine Co., and A. F. Christensen, Jarvis Engineering Works.

Time marches on, and in the case of last week's puzzle it marched for 26,045 miles.

John L. Vaupel, district manager, Barium Steel Co., Boston, reports that a general contractor placed a \$100,000 order with a steel fabricator to furnish and erect the steel for a railroad bridge as designed, but with the understanding that 50 tons more steel for the ballast floor would be furnished and erected. When the fabricator figured the unit price he received for the work, it proved to be \$2 per ton lower than in the original contract. How many tons of steel in the original contract? The real problem is where he got the steel!

machine tool high spots

sales
inquiries
and
production

by W.A. Lloyd



A Growing Awareness—As the magnitude of the task facing the machine tool industry began to take shape this week, an awareness of the growing shortage of machine tools was gaining recognition in the industrial top echelon.

In Detroit, T. H. Keating, general manager of General Motors' Chevrolet Motor Div., said work will begin immediately on the extensive tooling and development of production machines to reactivate the government's Tonawanda, N. Y., plant for jet engine production. (THE IRON AGE, Feb. 22, 1951, p. 94.) Slow-up factors are size of the project, plus the already overloaded condition of the machine tool industry.

About Half to Go—More than half the machine tools needed to start production of Pratt & Whitney aircraft engines are now in Ford Motor Co.'s aircraft engine plant in Chicago, according to John Dykstra, vice-president.

The rest has either been ordered or is being rehabilitated from a machine tool pool as fast as processing of the many different parts and coordinating of changed schedules will permit, he said. Last October, the company estimated production would begin in about 18 months.

Still "Very Shortly"—Latest unofficial word from Washington is that pool order contracts will be issued "very shortly." Still delaying the procedure are technicalities in the writing of the basic contract. Indications are that there will be no cash down payments with the pool orders and some machine tool builders need cash. Also on the agenda is an order similar to World War II's E-1-B, which is expected within a week or 10 days.

Foreign Trade Hit—The present situation is adversely affecting foreign orders, including ECA and Export-Import bank transactions. One company with a backlog of 250 foreign machines has ratings for only 15. Much of the British program is not rated,

reportedly because order E-1-B is expected to be issued soon, which will cover this business.

Prefers Subcontracting—One story had it this week that certificates of necessity for the machine tool industry are being held up because the government wants the industry to accomplish the necessary increases in production beyond present plant capacity by means of subcontracting rather than through plant expansion.

Hunting Up Capacity—Demands of the defense program on tool and die shop capacity are expected to be substantial, far more than is generally realized. It is indicated that the defense program officials are looking to place tooling and gear work.

Contract tool and die shops are anxious to buy new machine tools and some are trying to get certificates of necessity for plant expansions but none have been issued as yet.

December Shipments—Sales invoiced by contract tool and die shops in December were very high, and orders also increased, but not commensurately with shipments. Backlog for the industry is currently estimated at about 2 months.


ORDERS AND SHIPMENTS

	New Orders	Foreign	Shipments
1950			
Jan.	99.7	26.7	52.8
Feb.	89.2	18.8	56.1
Mar.	107.4	24.9	75.3
Apr.	98.9	17.4	61.6
May	116.4	18.4	82.5
June	124.1	23.0	91.9
July	253.1	22.3	68.3
Aug.	305.1	34.2	95.7
Sept.	280.6	27.2	101.6
Oct.	289.6	49.5	100.9
Nov.	291.9	26.6	110.9
Dec.	410.1	112.8	135.7
1951			
Jan.	478.8*	62.2*	113.9*

* Preliminary figures.

Average shipments 1945-47 = 100 pct.

FREE *publications*



These publications describe money - saving equipment and services . . . they are free with no obligation . . . just fill in and mail the postcard on the opposite page.

Cuts Plating Time

More production at less cost is the subject of a new 4-p. folder telling how hard chrome plate is a matter of minutes with Chromaster. The bulletin explains how the unit makes Chromasol plating possible in a few minutes without extra tools, extra room and additional help. Other advantages of the method are also described. *Industrial Chrome Div., Ward Leonard Electric Co.*

For free copy insert No. 1 on postcard.

Squaring Shears

Standard features of Wysong power squaring shears, for quick and accurate positioning and straight line burr-free shearing, are described in a new 6-p. illustrated folder. Specifications and construction details of 17 models are presented, along with information on various models of air power shears. *Wysong & Miles Co.*

For free copy insert No. 2 on postcard.

Cleaning Ferrous Metals

Entitled "Heavy-Duty Alkaline Cleaning of Ferrous Metals," a new 8-p. illustrated booklet describes approved methods for alkaline soak tank cleaning, alkaline spray cleaning and alkaline electrolytic cleaning, barrel cleaning, steam gun cleaning and manual (bucket-and-brush) cleaning of walls and floors. Procedures are fully described, including recommendations for proper cleaners to be used for specialized purposes. *Special Chemicals Dept., Pennsylvania Salt Mfg. Co.*

For free copy insert No. 3 on postcard.

Tool and Die Steels

Photomicrographs showing the difference between average steels and fully uniform Latrobe Desegitized high speed and high carbon-high chromium die steels are presented in an 8-p. bulletin. Advantages of these tool steels over standard process steels are detailed, and a table lists chemical composition of the various types available. *Latrobe Electric Steel Co.*

For free copy insert No. 4 on postcard.

Piping Data Card

Dimensions on welding fittings and flanges are condensed and reproduced on an 8½ x 11-in. card. One side covers the Weldell line of welding fittings, showing wall thickness and essential dimensions for all types of fittings for every nominal pipe size from ½ to 30 in. The other side covers essential dimensions and bolting data for all types of forged steel flanges, in all weights, for nominal pipe sizes from ½ to 24 in. Other useful information for piping engineers is also given. *Taylor Forge & Pipe Works.*

For free copy insert No. 5 on postcard.

Rotary Pumps

Photos, dimensional drawings and specifications covering Roper rotary pumps for manufacturing, marine, petroleum and process industries are given in a new 8-p. catalog. The booklet lists construction features and illustrates component parts, as well as detailing available pump head sizes and capacities. Examples of custom built pumps are also shown. *Geo. D. Roper Corp.*

For free copy insert No. 6 on postcard.

Diesel-Electric Locomotive

The General Electric 70-ton 600-hp road switcher locomotive, featuring flexibility and combining light axle weight with high horsepower, is described in a new 16-p. bulletin listing specifications and detailing performances. Complete information on the power plant and electric drive unit is given, along with testimonials from a few of the many railroads currently using this low cost equipment. *Apparatus Dept., General Electric Co.*

For free copy insert No. 7 on postcard.

Corrosion Control

Uses of Casey & Case vinyl based primers, intermediates and finishes in a variety of industries are illustrated and described in a new 12-p. booklet listing specific properties of these exterior coatings and tank linings. A chart shows a number of the many chemicals in which these coatings will withstand constant exposure, and other features of the material are detailed. *Casey & Case Coating Co.*

For free copy insert No. 8 on postcard.

Stud Welding Units

Detailed specifications and performance characteristics of two Nelwelder power units specifically designed to improve and extend the advantages of stud welding are described in a new 4-p. bulletin. One is a small compact power unit which gives stud welding performance equivalent to two conventional 400-amp generators in parallel. It can be used to weld studs up to and including 5/8 in. in diam. The other is a battery unit with a self-contained automatic charge-

Turn to Page 168

NEW *production ideas*

new and improved
production ideas,
equipment, services
and methods de-
scribed here offer
production econ-
omies . . . fill in and
mail postcard.

Lock Seam Tube Mill

Produces 30,000 ft of 2-in. diam
(0.049 wall) tubing per 8 hr.

Unit construction features the Model 1½ F lock seam tube mill. Each pair of roll spindles is contained in one separate housing complete with speed reducer. This facilitates the removal of any of these units, or simplifies the installation of additional units. They are built with the patented Ardcor universal gearing arrangement that permits the use of different diameter top rolls merely by raising the top spindle through an adjusting screw. The worm shafts, that operate in an oil bath, along with the spur gears are chrome-molybdenum steel, hardened and ground. The worm gear is navy bronze. Roll spindles are chrome-molybdenum steel hardened and ground. A welded steel base houses the entire drive mechanism. Forming and cutting off of the tube is one continuous operation. *American Roller Die Corp.*

For more data insert No. 20 on postcard.

Automatic Numbering Head

Sharp, accurate stamping of
consecutive or repeat numbers.

A new line of automatic numbering heads for punch press stamping permits numbering from 1 to 9999999999 in sharp face Gothic characters for numbering any material including steel. Flat face Gothic or shaded Roman are recommended for use on brass or other soft metals. Direct reading is possible on the larger heads which enables determination of machine setting at a glance. *Parker Stamp Works, Inc.*

For more data insert No. 21 on postcard.

Milling Cutter Arbors

With socket head standard lock
screw; no special wrench required.

A new shell milling cutter Type C Arbor is universally adaptable to milling machines and cutter grinders having National Standard spindle tapers. Available in ½ to 2-in. diam, this arbor is manufactured from chrome-molybdenum steel. Removable keys make it possible to install side milling cutters. *Nelco Tool Co.*

For more data insert No. 22 on postcard.

Labeling Tape

Write on it; it won't smudge;
resists dirt, oil, water, acids.

Labelon Tape, a new pressure-sensitive tape on which one can write and which becomes a waterproof, oil-proof, smudge-proof, and acid-resistant label is made of two layers of acetate with a white waxy substance sandwiched in between. Pressure on the top clear layer destroys the thin white layer and exposes the colored bottom layer.

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NEW YORK 17, N. Y.

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3/1/51
Fill in above
the number
of the item
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data.

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Fill in above
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production ideas

Continued

will adhere to metal, glass, plastics, ceramics, wood, and to almost any clean surface. The tape can be transferred from one surface to another repeatedly without leaving a sticky residue or destroying the adhesive qualities. Labelon is available in black, blue, red, or green in $\frac{1}{8}$, $\frac{1}{4}$, 1, and $1\frac{1}{2}$ in. widths in standard rolls 400 in. long and industrial rolls 800 in. long. The tape will not discolor, is weather-proof, and will adhere and retain its legibility over a temperature range of -40°F to 150°F . *Labelon Tape Co.*

For more data insert No. 23 on postcard.

Improved Drill Jig

Faster adjustability, greater accuracy for close tolerances.

Only one bushing plate is now required with the Kam-Grip drill jig to accommodate a range of standard drill bushings up to 11/32 in.

drill size; only one double-end anvil is required to accommodate work stock diameters from $\frac{1}{8}$ to $\frac{1}{4}$ in. Setup time is reduced in adapting the jig for use from one job to another. Model X750 can be operated manually, or automatically when actuated by the drill press spindle. *Manufacturer's Engineering Service.*

For more data insert No. 24 on postcard.

Motorized Torch Holder

For raising and lowering cutting torches on gas cutting machines.

By remote control a motorized torch holder, which is designed for mounting on the 3-in. square torch bar of an Airco Oxygraph or Travograph, raises or lowers the cutting torch through 5 in. of travel. The remote control switch box mounted on the torch bar at the operator's control station provides a switch to actuate each of four torches individually and a master switch for simultaneous control of all four torches. The torch holder can be positioned vertically, 90° left or right parallel to the longitudinal

axis of the torch bar. With an adapter it can be positioned 90° forward perpendicular to the horizontal axis of the torch bar. *Air Reduction.*

For more data insert No. 25 on postcard.

Electronic Recorder

Quickly measures temperature of the rotor in large electric generators.

The Electronik has been designed to provide a better and more economical instrument to assist operators in avoiding overloads. It furnishes a 12 in. strip chart record that can be used as a guide for gradually cooling a generator. In designing the instrument special consideration was given to users who, generating large volumes of their own power, want maximum safety and dependability for peak capacity operation. *Brown Instrument Div., Minneapolis-Honeywell Regulator Co.*

For more data insert No. 26 on postcard.

Resin Cement

May be cast in almost any form; no voltage drop as a conductor.

A castable conductor of electrical current, called Conductoplast, exhibits practically no voltage drop when used as a conductor. It can be plated, has a tensile strength of 1500 psi, a compression strength of 15,000 psi and excellent adhesion to ceramic materials. A non-conductor called Resistoplast has much the same properties except that it does not conduct current. Both materials are available in pilot plant quantities. *Atlas Mineral Products Co.*

For more data insert No. 27 on postcard.

Dual-Purpose Wheel Grinder

Keeps chasers, cut-off blades sharp.

The left hand side of the wheel grinder is designed to sharpen chasers for threading up to 8 in. pipe. Pipe and tube cut-off blades are sharpened on the right hand side of the machine. The grinder permits repeated sharpenings down to within $\frac{1}{2}$ in. of the end of the chasers. It converts dull cut-off blades into production-boosting tools in a matter of minutes. The mechanism is adjustable for any angle of bevel and true diameter of blade can be retained even after repeated sharpenings, it is reported. Power is supplied by a $1\frac{1}{2}$ hp totally enclosed, 220/440 v, 3 phase

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<p>3/1/51</p> <p>Name <input type="checkbox"/></p> <p>Title</p> <p>Company Fill in above the number of the item on which you need further data.</p> <p>Co. Address</p> <p>THE IRON AGE, New York 17</p>	<p>3/1/51</p> <p>Name <input type="checkbox"/></p> <p>Title</p> <p>Company Fill in above the number of the item on which you need further data.</p> <p>Co. Address</p> <p>THE IRON AGE, New York 17</p>

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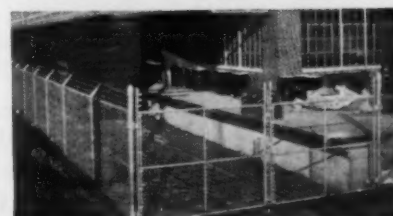
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THE ONLY FENCE...



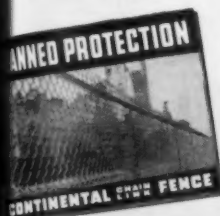
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FREE FENCE MANUAL

A card will bring your copy of "Planned Protection"—a complete manual on modern protection and control of property. Ask for it at your nearest sales office or write us at Kokomo, Indiana.



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GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, gauges, tempers and finishes, including Galvanized,

KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire.

ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

IRON AGE

introduces

William F. Weinreich, named assistant to the vice-president who is in administrative charge of the Oil City, Pa., plant of **WORTHINGTON PUMP & MACHINERY CORP.** **A. William Fraser**, appointed Midwest sales manager. With headquarters in Chicago, Mr. Fraser will direct the sales of St. Paul, Kansas City, St. Louis and Chicago.

C. J. Gerker, appointed general manager, **OHIO HOIST & MFG. CO.** In this position, Mr. Gerker will be in charge of the company's factory at Lisbon, Ohio, and the executive office in Cleveland.

Philip J. Monaghan, appointed to the newly-created position of manufacturing manager of the Truck & Coach Div., of **GENERAL MOTORS CORP.**, Pontiac, Mich.

Harry F. Blythe, appointed manager of accounting for the newly-created Electronic Tube Div., of **WESTINGHOUSE ELECTRIC CORP.**, Bloomfield, N. J., and **Harry D. Hanafus**, appointed purchasing agent for the same division.

Lewis P. Favorite, named manager, New York district sales office, of **ALUMINUM COMPANY OF AMERICA**. Mr. Favorite succeeds **Edward B. Wilber** who has left for another firm.

Ambrose L. Moll, elected treasurer of **THE ATLAS MINERAL PRODUCTS CO.**, Mertztown, Pa.

Robert R. Applegate, named metallurgical engineer, **MIR-O-COL ALLOY CO., INC.**, Los Angeles.

Ancel C. Adams, appointed general plant superintendent of the **CLEVELAND CRANE & ENGINEERING CO.**, Wickliffe, Ohio. Mr. Adams has been with the company for 28 years, during which time he served in various capacities.

John S. Mayfield, elected vice-president of the **AMERICAN RAIL & STEEL CO.**, Washington, D. C. As vice-president Mr. Mayfield will direct the firm's rail and steel operations in Latin America and in the Orient.

L. E. McHaney, joined **TEXAS ENGINEERING & MFG. CO., INC.**, Dallas, as contract administrator. Mr. McHaney will have supervision over all company contracts.

Alan W. Abegglen, appointed to the sales force of the Beaver Falls, Pa., district sales office of **THE BABCOCK & WILCOX TUBE CO.**, also **David W. Jones, Jr.**, appointed sales agent in the Rocky Mountain area, with offices in Denver.

John D. Parobek, appointed branch manager in Houston for the **TRAIL-MOBILE CO.** Other appointments: **Thomas Peacock**, formerly manager of the sub-branch in Greensboro, N. C., has been appointed branch manager in Charlotte, N. C., and **Robert S. Sawyer** moved from Amarillo, Tex., to Oklahoma City as branch manager.

Tom Payton, appointed service manager for **CORY CORP.**, Chicago. Mr. Payton served the company as national field service manager, prior to this assignment.

Ralph Hubbart, named president of **MICHIGAN POWDERED METAL PRODUCTS CO., INC.**, Northville, Mich., and **Leroy E. O'Dell**, named vice-president and will have direct charge of operations.

William D. Taylor, named assistant manager of fabrication of the **BY-PRODUCTS STEEL CO.**, a division of Lukens Steel Co., Coatesville, Pa. **Robert J. Simes**, named to the position of assistant superintendent, mechanical maintenance department.

Turn to Page 90



H. V. LINDBERGH, appointed a vice-president of **Kaiser-Fraser Corp.**, Willow Run, Mich.



A. H. ROSENBLOOM, elected vice-president of **Joseph Behr & Sons, Inc.**, Rockford, Ill.



A. B. DRASTRUP, appointed assistant to the president of the **A. M. Byers Co.**, Pittsburgh.

IRON AGE

salutes

Harry B. Osborn, Jr.



HIS talent for finding time is surpassed only by his ability to do things with it. Though he's always busy, he never seems hurried. He has a way of getting things done; he makes every effort count.

If life begins at 40, the future accomplishments of Harry B. Osborn, Jr., are a subject for speculation. He already belongs to more organizations, makes more speeches, writes more papers, and can answer more questions than most septuagenarians in the academic and business world combined.

He renders yeoman service as technical director of Ohio Crankshaft Co., being an authority on induction heating. He constantly makes new friends for himself and his company because he's naturally a friendly guy, and he has the right answers to the many questions asked of him.

Doc, as he is known to his friends, is a man of broad interests and boundless energy who gives unstintingly to civic service. Here are a few of the extra jobs he has found time for:

Air raid warden, member of integrating committee for production of armor piercing shot, trustee and treasurer of his church, write a book on induction heating, member of special police of suburb in which he lives, and edit Cleveland Engineering Society's new organ, *Cleveland Engineering*.

He belongs to or holds office in some 15 other societies and organizations. In addition, he flies his own plane on business trips and for pleasure and plays a good game of golf.

IRON AGE introduces

Continued



WALTER D. MONROE, JR., elected chairman of the board and president of Chicago Steel Service Co., Chicago.



E. O. DIXON, appointed vice-president in charge of research and metallurgy of Ladish Co., Cudahy, Wis.



CHARLES E. WILDERMAN, appointed a vice-president of the Utica Drop Forge & Tool Corp., Utica, N. Y.



R. H. ANDERSON, appointed director of purchases of the New Holland Machine Div., of The Sperry Corp., New Holland, Pa.

John M. Auty, named a director of the PITTSBURGH SCREW & BOLT CORP., Pittsburgh.

Frederick D. Keeler, appointed director of government services of VOLCO BRASS & COPPER CO. Mr. Keeler will make his headquarters in Washington, D. C.

Anthony J. Zino, Jr., named assistant to the president of SWAN-FINCH OIL CORP., New York.

John A. Green, appointed sales representative in the southwest territory for AMPEREX ELECTRONIC CORP., Dallas.

John W. Nestor, appointed assistant manager of the finishes division of E. I. DU PONT DE NEMOURS & CO., Wilmington, Del. Joseph B. Dietz becomes assistant director of sales and William P. Fisher, formerly assistant manager of industrial sales, now becomes manager.

Francis K. McCune, appointed manager of engineering of the apparatus division, for GENERAL ELECTRIC CO., Schenectady. Mr. McCune succeeds Ernest E. Johnson, who recently was named general manager of the company's general engineering company.

James D. Copeland, named administrative assistant in the industrial relations department of DRAVO CORP., Pittsburgh.

Richard Crawford, appointed general sales manager for the British subsidiary of MINE SAFETY APPLIANCES CO., Pittsburgh.

William R. Gerhardt, appointed assistant director of procurement for REMINGTON RAND, INC., New York.

C. A. Wagner, appointed representative by the BILLINGS & SPENCER CO. With offices in Dallas, Mr. Wagner's territory includes Texas, Arkansas, Louisiana and Oklahoma.

Donald J. Finlayson, named manager of the merchandise division of BRIDGEPORT BRASS CO., Bridgeport.

J. Herbert Babcock, elected a vice-president of the HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y. At the same time Charles H. Winkler was made assistant treasurer, and Thomas F. Willers, comptroller.

Ephriam M. Detwiler, assumes the position of manufacturing manager for the LAMSON CORP., Syracuse, N. Y.

J. L. Singleton, named vice-president in charge of the general machinery division of ALLIS-CHALMERS MFG. CO., New York. Others promoted: R. S. Stevenson, named vice-president in charge of the tractor division; A. W. Van Hercke, named vice-president in charge of engineering, tractor division and John Ernst was named vice-president in charge of manufacturing, tractor division. Frank R. Hunter, named manager of a new branch office at Wichita, Kansas.

Munro Corbin, elected comptroller and I. C. Rowe, secretary of the ROCKWELL MFG. CO., Pittsburgh.

Robert A. Brayton, appointed representative of ARMCO INTERNATIONAL CORP., Japan. Mr. Brayton, who has been manager of sales promotion, will be replaced by Eugene R. Blair.

Frank L. Murphy, joined the sales staff of PULLMAN-STANDARD CAR MFG. CO., in Washington, D. C.

E. C. Row, elected president and general manager of the CHRYSLER CORP. OF CANADA, LTD. Mr. Row has been associated with the company for more than 34 years.

M. B. Roosa, promoted to sales manager of the PARKER RUST PROOF CO., Detroit. He succeeds F. J. DeWitt, recently elevated to vice-president in charge of sales.

J. J. Mitchell, retired as vice-president of BULL DOG ELECTRIC PRODUCTS CO., Detroit. He joined the company in 1934 as a sales specialist.

OBITUARIES

C. W. Churchill, 70, president and general manager of the Chrysler Corp. of Canada, Ltd., died recently.

Edward Joseph Helline, 48, general sales manager of the Reliance Div. of the Eaton Mfg. Co., Massillon, Ohio, died recently.

William H. Seaman, 64, president and general manager of the National Roll & Foundry Co., Avonmore, Pa., died recently.

William C. Loyd, 81, who headed construction of the Gary, Ind., Sheet and Tin Mill of the U. S. Steel Co., died recently.

Edward L. Holljes, 67, general sales manager of the William Sellers Co., Div., Consolidated Machine Tool Corp., died recently.

Patterns in Pensions



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THE success of your pension plan will depend upon a streamlining job which gears your pension system with *your* particular financial, personnel and industrial problems. And, if your pension plan is not streamlined to fit your company's circumstances, you may suffer serious loss in dollars and greatly reduce the effectiveness of your plan.

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March 1, 1951

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on the assembly line

automotive
news and
opinions

Alloy bar shortage is new barrier to auto output . . . Producers still hopeful . . . Announce new proving ground.



by Walter G. Patton

Bottleneck on Bars—The 20 pct cutback in sheet steel for auto production may turn out to be academic. Sources close to the steel situation see forging bars, particularly alloy, as a choking point in future auto output. Cuts in forging bar deliveries of more than 20 pct are already here. Small plants report alloy bars practically impossible to get. Within 30 days this shortage is certain to hit auto output hard.

Reasons Why—Detroit steel buyers say three factors are contributing to the present alloy bar shortage: (1) Cutbacks in alloy quotas caused by stockpiling, (2) a shortage of hot-top capacity in the mills, (3) diversion of forgings for large vehicles for defense, including trucks. During the last war, the percentage of alloy steel for defense doubled. For a brief period, it almost tripled. The same trend is starting up strongly again. Stockpiling of alloying elements has definitely aggravated the situation.

A Little Optimism—For the first time in weeks, some auto executives have become slightly less pessimistic about future production. The argument runs like this: A cutback of 20 pct would permit output of cars in the first half of 1950 at an annual rate of

nearly 5 million vehicles. A 30 pct cutback would result in production at a yearly rate of about 4,300,000 units.

While production at this level is about 50 pct above the 1939 production rate, it is disappointingly small in terms of today's plant capacity. Optimism stems from these two factors: (1) the auto industry has always demonstrated great resourcefulness in obtaining and using available material, (2) up to now Washington's bark has been worse than its bite. The stiff orders issued by NPA have always been softened with time.

Gleam is Going—The exact time cannot be determined but extensive changes in automobile bright work will occur starting sometime after Mar. 1. The rate and nature of changes will largely depend on Washington rulings.

Nickel plating is now permitted only on functional parts for automobiles. This includes bumpers, bumper guards and door handles. Hub caps, although now permitted, are on the doubtful list. Slated to go soon in the campaign to conserve nickel and chromium are plated interior decorative parts, hood ornaments and grilles.

Three Choices Left—There are really only three surface finish choices open to the car manufacturer: (1) Bright zinc, (2) alumi-

num paint covered by clear lacquer and (3) paint. Initially, it is expected that several GM divisions will try bright zinc plating. The extent to which zinc may be used depends on its availability.

Ford may use some bright zinc and is also expected to make extensive use of aluminum paint. Chrysler plans are not definitely known but some opposition to the use of bright zinc has been heard. Weaknesses of substitutes for chromium are: (1) Inability to stand up in service, (2) relatively high cost for an interior finish, (3) lack of necessary material.

Bad All Over—While nickel and copper shortages have got the headlines, there are metallic shortages all along the line. Chromium-type stainless has not been restricted. Yet several weeks ago alloy producers were protesting vigorously about their inability to get chromium. Little publicity has been given to a shortage of ferrosilicon.

One shortage that was universally feared has thus far failed to materialize. Not only has lead been available in reasonable quantities thus far but the stockpile on this one item, according to available reports, is fairly well caught up. Other metallic stockpiles are reported to be substantially behind quota.

assembly line

Continued

Cycle of Shortages—Industry observers have consistently pointed out that material shortages usually go through a fairly consistent cycle. The sequence is not regular but generally follows a pattern something like this: Flat-rolled steel is the first item to become short. Next on the shortage list is bar steel. Subsequently, the critical supply situation is extended to alloy steel.

Finally, the supply of pig iron becomes seriously limited. A pig iron shortage is not here yet but automobile sources report a scramble is under way to bolster the dwindling supply of this precious metal.

Weekend Cars Wear Out—Curiously enough, wear on an automobile can occur at more than a normal rate on a car that is driven fewer miles than normal.

Speaking before the Detroit Section of ASM, Walter E. Jominy, president of the American Society for Metals and staff metallurgist for Chrysler Corp., told about one car that was driven only 15,000 miles in 4 years, operated at short intervals. Wear and tear on this vehicle, Jominy said, was many times greater than if the vehicle had been in constant, every-day use.

Jominy also stressed the importance of keeping the air cleaner on automobiles in good condition, pointing out that approximately 10,000 gallons of air are consumed for every gallon of gasoline used in an automobile.

Chrysler Proving Ground—Now it's official. Chrysler will build a proving ground near Chelsea, Mich. A 4000-acre tract is being fenced in with heavy gage steel fence. Estimated cost of the 12 miles of fence is \$200,000.

General Motors is adding to its proving ground facilities for testing military combat and transport vehicles. One thousand acres of land have been purchased adjacent to the present proving ground

near Milford, Mich. Construction will start immediately and is scheduled for completion in July. A natural lake on the property will be used for deep fording and landing operations, as well as for amphibious vehicle tests. A service building for army tanks and other types of combat transport equipment is being built.

Fargo Motor VP—Gervais W. Trichel, former chief of the U. S. Army Ordnance Dept.'s Rocket development program and one-time advisor to the director of the atomic bomb project, has been appointed a vice-president and a member of the board of directors of Fargo Motor Corp., fleet sales subsidiary of Chrysler Corp.

Trichel joined Chrysler Corp. as a staff assistant to the general manager in October 1946, after 30 years' service with the U. S. Army, including the job of directing rocket development from 1943 to 1945.

Reuther to Washington—Right now it appears to be a 50-50 bet that Walter Reuther, president of UAW-CIO will go to Washington.

Despite objections from both CIO and AFL there is a good possibility Reuther will get the nod from the United Labor Policy Committee and move into a top advisory job with mobilization director C. E. Wilson.

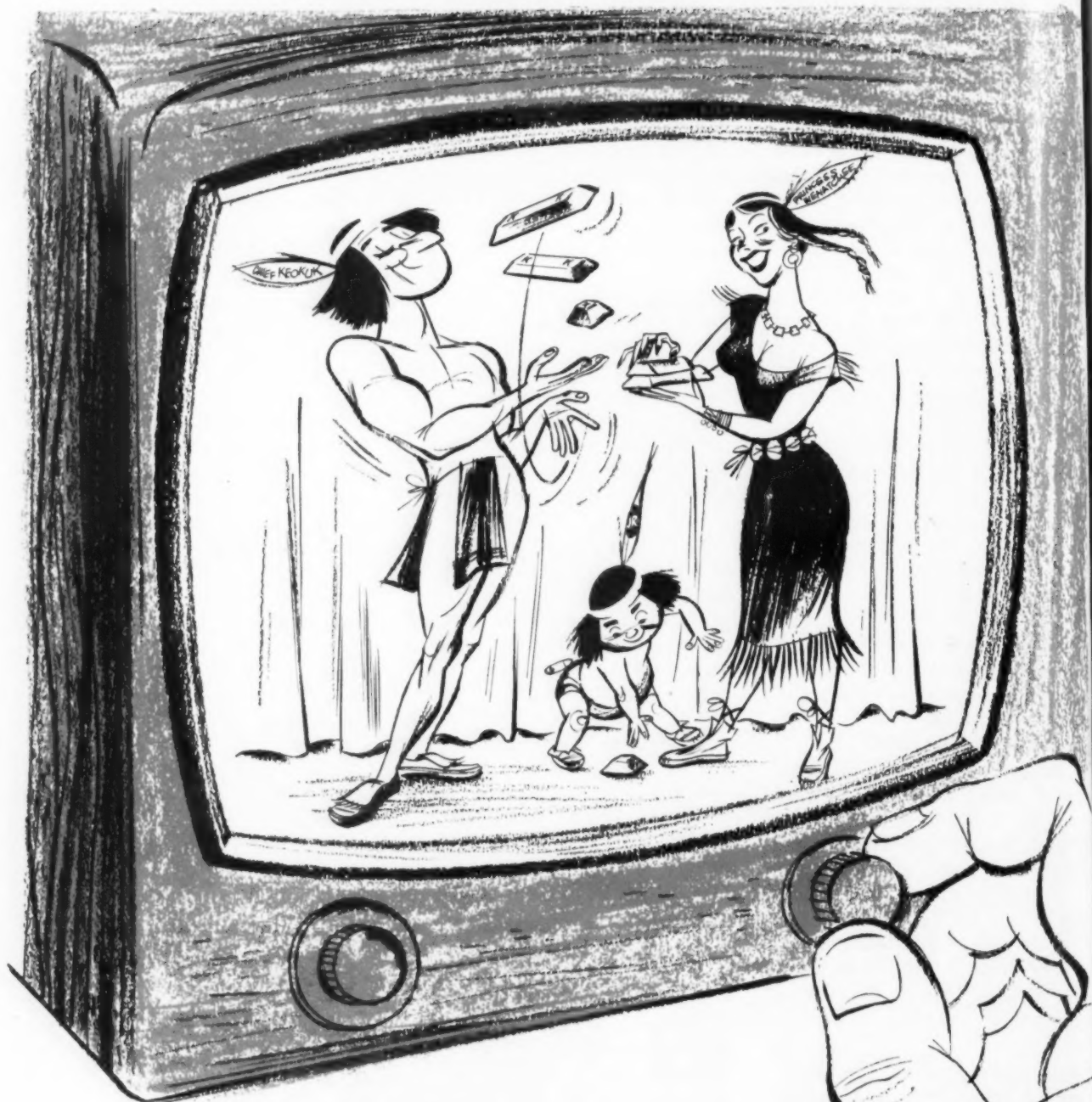
The way for Reuther to take the Washington job has already been cleared. He will not have to resign his labor post to take over this assignment. Industry executives accepting Washington posts are required to give up their civilian jobs.

Of Mutual Benefit—Areawide seniority privileges have been extended to Ford workers. The latest agreement covers five Detroit-area plants employing 80,000 workers. Employees laid off at any of the five plants will be rehired at other Ford plants before new workers are taken in from the outside. The agreement is not precedent-making, as reported by union sources. A similar move was made during World War II. Obviously the agreement was made to meet growing competition from other plants for experienced workers.

THE BULL OF THE WOODS

By J. R. Williams





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60 lb. pigs

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west coast progress report

*digest of
far west
industrial
activity*

by R.T.Reinhardt



Few Prime Contracts—Lack of defense contracts and shrinking material supplies are draining skilled labor from many of the West's smaller cities into the few areas where prime contracts have been awarded. Large contracts for aircraft manufacturing in southern California and Seattle have built up payrolls but these are the exception.

However, employment in California continues to generally increase and in January was 9 pct above the same month a year ago with manufacturing employment totaling 810,000 or 15.5 pct higher than a year ago. Employment in the fabricating metal industries was up 30 pct last month over a year ago but recently there has been a noticeable decline due primarily to material shortages in non-defense operations.

Some Bright Spots—A few western plants have experienced increased activity through defense work.

Production of component parts for aircraft assembly in greater quantities is scheduled by the Axelson Manufacturing Co., Los Angeles, which has purchased 44 acres in the southeastern part of town for a \$650,000 building where parts-making facilities will be used to produce for Douglas, Lockheed, North American and Boeing.

Breaking Ground—California Cold Rolled Steel Corp. at Los Angeles is breaking ground for a new structure to house three new annealing furnaces which will increase this capacity 42 pct. A new 4-high cold reduction mill is soon to be installed which will enable this producer to offer strip as light as .010 inch and slitting capacity will likewise be increased. This company is currently operating at approximately 20 pct on defense rated orders and substantial increases are expected.

California Wire Cloth Co. set an all-time high production record in January when wire production reached 3110 tons as against a past average of 2000 tons per month.

Cupolas to Go?—Foundries in southern California are seriously considering switching to gas or electricity instead of cupolas because of the continuing difficulty of obtaining coke and strict smog regulations on control of emissions from these furnaces.

Smog control devices on both electric and gas-fired melting furnaces are generally conceded to be less expensive than those applying to coke burning cupolas.

Foundrymen generally complain about the shortage of pig iron and point out that last month alone approximately 20,000 tons of imported pig were absorbed in south-

ern California whereas 10 years ago that same amount would have flooded the market.

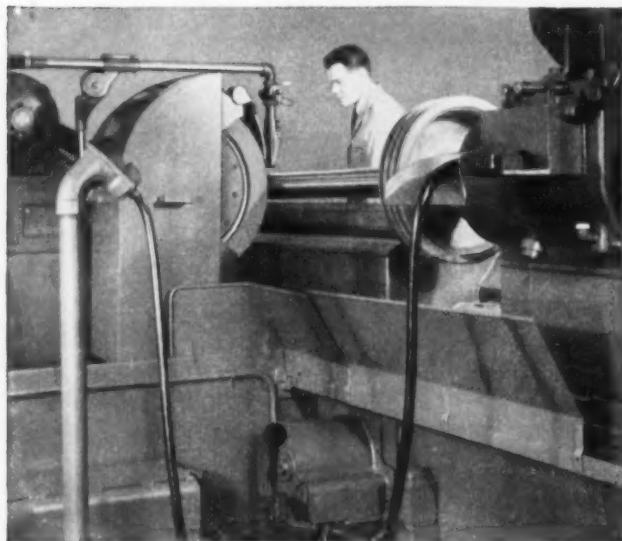
Major Expansion—In Portland, Ore., the Hyster Co., which is participating in defense contracts awarded to the Caterpillar Tractor Co., is planning a major expansion to produce equipment for Caterpillar's largest units. Oregon Steel Mills in Portland will construct a new roll turning shop and a crane way.

At Salt Lake City an \$800,000 expansion program is under way at Structural Steel & Forge Co. and American Foundry & Machine Co., affiliated companies. Two gas-fired draw furnaces for making alloy steel are being installed and working space is being enlarged at American Foundry.

Beginning to Hurt—An indication of the tightness of the scrap market in the Pacific Northwest is the concern expressed by foundrymen and other scrap users over ingot shipment out of that area by Isaacson Iron Works.

Isaacson has been shipping ingots to Kaiser Steel Corp. and others. The manager of one of the larger foundries says, "Producing ingots for resale out of this area is hurting plenty as there is no return of scrap from such operations. It just bleeds everything out."

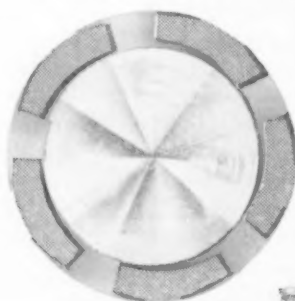
Shopping for Large Centertype Grinders?



CINCINNATI FILMATIC 16" x 120" Heavy Duty Grinding Machine showing gap table; for grinding locomotive piston rods, steel mill pinions, and similar parts.



Electronic selection of table traverse rates



FILMATIC bearings



CINCINNATI GRINDERS INCORPORATED CINCINNATI 9, OHIO

CINCINNATI FILMATIC 16" x 96" Roll Grinding Machine, equipped with automatic wheel balancing and profile grinding wheel truing. Also available in plain and gap table styles. Catalog No. G-600.

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the federal view

*this week in
washington*

by Eugene J. Hardy



Wilson Boosts Seaway—Key members of the House Public Works Committee are agreed the St. Lawrence Seaway was given a strong upward boost by the testimony of Defense Mobilizer C. E. Wilson, a former opponent of the project. Chances of approval at this session of Congress, however, are still rated slightly less than even.

Mr. Wilson's approval of the project as a defense measure was based on the belief the steel industry will reach "a capacity of 130 million ingot tons by 1960." He estimated ore requirements for such capacity at about 160 million tons, of which more than 40 million tons would have to be obtained outside the U. S. Hence, the importance of the Seaway as a means of quick transportation for the Labrador-Quebec iron ore.

Material, Manpower Needs Slight—Mobilization Chief Wilson feels material and manpower needs are insignificant, less than ½ of 1 pct of annual supplies, in light of Seaway benefits.

The project would require annually about 30,000 tons of steel, 500 tons of copper, and 750,000 barrels of cement. About 7000 U. S. workers would be needed. The project could be completed in about 5 years if started now—about the time volume output of ore would be ready for shipment.

Interior Secretary Oscar Chapman flatly states that if the Sea-

way is not built this country will not "be able to meet national iron ore requirements 5 years from now." He forecasts an ore deficit of 3 million tons this year and 11 million tons 2 years from now.

Important for Titanium—Power aspects of the project, Mr. Chapman maintains, are equally important to titanium production. Large titanium deposits in combination with iron ore located in Eastern Quebec can be developed if power is available at a low rate. Production can be obtained from this ore by two processes, both needing substantially more power per lb than aluminum.

Direct Reduction—New interest in direct-reduction processes (THE IRON AGE, Feb. 22, p. 93) is spurring a congressional committee to re-examine the government's present hands-off policy toward short-cut reduction.

The House Armed Services Committee is particularly interested in the feasibility—or lack of it—in investing \$6 million in a direct-reduction plant at Longview, Texas.

Sponsor of the Longview project, Julian Madaras, is telling the committee and the Interior Dept. he can produce 10,000 tons of reduced ore per month if the government will spend the \$6 million necessary to convert the World War II pilot plant at Longview into full production facilities.

Several years ago Bureau of Mines turned thumbs down on the project, pointing out the Madaras process required 22 hours to reduce 1 ton of ore. Madaras claims reduction time has been cut to 1 hour, and the problem of excessive impurities has been beaten.

World Allocations—International machinery for control of scarce commodities by North Atlantic Pact nations and other free countries is beginning rapidly.

Under the sponsorship of the United States, United Kingdom and France, six committees have been set up. These committees will advise on: copper, zinc and lead; tungsten and molybdenum; manganese, nickel and cobalt; sulphur; cotton; and wool. The copper and lead committee has already met.

Competitive Bids Ending—The decision of the Army Signal Corps to stop advertising for bids on contracts means that practically all Army, Navy, and Air Force buying will be via negotiated contracts after Mar. 1.

The Navy, which buys hardware and tools for all the services, has switched virtually all its procurement to the negotiation method. The military formerly issued 25 to 30 invitations to bid daily, but this has now dwindled to one or two a day.

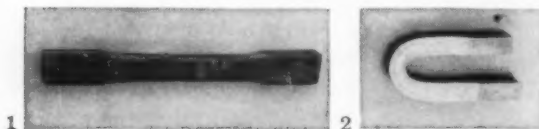
INLAND DATA for STEEL USERS INLAND STEEL CO.

38 S. Dearborn Street, Chicago 3, Illinois

*Typical mill tests
for quality control
of your steels*

An important aspect of steel manufacturing is that, in the great majority of cases, steel is "tailor-made" to meet a specification or to make a particular part. It is therefore necessary for the steelmaker to know as much about each heat of steel as can be efficiently obtained. The tests described below are the main tests run by the steel producer to check the quality of the steel

against the specified requirements. Naturally these tests do not stand alone as the final quality determinants. The steelmaker uses many other tests and his metallurgical experience as well as his knowledge of the steel fabricating processes to assure the customer of the right steel for the job.



BEND TEST

Bend tests are employed to determine the ability of steel to withstand cracking during subsequent forming operations at the customer's plant. Basically, the test consists of bending test pieces through certain specified arcs. (photos 1 and 2). The amount of bending a piece of steel will withstand depends on its chemical composition, its tensile strength, its thickness, and its grain structure.



HARDNESS TEST

Abrasion, indentation, wear, cutting and shearing . . . all these are related to the hardness factor of the steel. Hardness tests are most often made after the steel has been heat-treated or just before it is to be temper rolled. Hardness is measured by Rockwell or Brinell testing machines (photo 3) which indent the surface of the specimen with a predetermined load. The

relationship of the load and depth of indentation is then translated into a hardness reading.

CUPPING TEST

Clues to a steel's suitability for future drawing operations are uncovered by the cupping test. In this test, a sample piece of steel is placed in a special machine in which a smooth metal ball is forced against the flat surface of the specimen thus drawing it into the form of a cup and continuing the



distortion until the material is fractured (photos 4 and 5).

TENSION TEST

In applications where the steel will be under stress, either static or dynamic, the steel mill quality control department is interested in determining certain mechanical properties of the steel . . . tensile strength, yield point and the amount of elongation in a specimen of a certain length. Specimens of the various products are pulled asunder until fractured by hydraulic or mechanical testing machines which accurately measure the applied load (photos 6 and 7).



CHEMICAL DETERMINATION

The most widely used tests for quality control of steel at the mill, are the tests which determine chemical compositions of the raw materials and the finished products. It is estimated that Inland runs 1,250,000 chemical determinations each year. In addition to the wet chemical tests, the spectrographic method (photo 8) is widely employed for making quick, accurate determinations.





FIG. 1—Charging the Lindberg high production mechanized batch type furnace. The unit is designed for a minimum of floor space, and no pits are required.

CARBONITRIDING

gains wider acceptance

Carbonitriding as a means of case hardening results in big savings on large production runs. An endothermic carrier gas is used in a compact furnace which combines low operating cost and high production with a minimum of handling. The furnace and auxiliary equipment has run for 2 years at a cost of 40¢ per operating hr.

The development and ever increasing use of the carbonitriding process represents one of the most important advances in heat treatment in several decades. Although carbonitriding is not new, it did lie somewhat dormant until within the last 5 years; postwar competition created renewed interest in this process as a method for producing a hard case.

Carbonitriding has virtually replaced liquid cyaniding as a means of case hardening large

quantities of low carbon steel parts. This does not imply that the liquid cyanide pot is obsolete. Manufacturers of parts produced in small quantities find this type of case hardening economical from the standpoint of equipment costs. Liquid cyaniding also eliminates the necessity of copper plating when localized case hardening is required on the extremities of some parts.

Carbonitriding is defined as "a process in



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which a ferrous alloy is case hardened by first being heated in a gaseous atmosphere of such composition that the alloy absorbs carbon and nitrogen simultaneously, and then being cooled at a rate that will produce desired properties."

The process has been performed successfully in the following types of furnaces: rotary retort, full muffle reciprocating hearth, continuous belt type, muffle type tray, bell retort type and the in-and-out batch type. Any equipment formerly used for gas carburizing can generally be adapted to carbonitriding. The equipment must be able to contain an atmosphere capable of penetrating dense loads of work. For clean work, it must be equipped with vestibules for charging and/or quenching which will also contain an atmosphere.

Present practice consists of heating ferrous alloy parts in an atmosphere of carburizing gas and ammonia at a temperature of from 1200° to 1650°F for a time commensurate with the case depth required. The parts are then quenched in gas, oil or water to produce the desired case and core properties.

An important factor in the increased use of this process is the fact that automatic or continuous liquid cyaniding facilities were not generally available; even if they were, the cost and maintenance made this type of equipment prohibitive. It is more difficult and costly to mechanize liquid salt bath furnaces than it is to mechanize gas atmosphere equipment.

Furnace Cuts Cycle Time

A unit was designed and built by the Lindberg Engineering Co. to replace some existing liquid cyaniding facilities. The Lindberg high-production carbonitriding furnace, shown in Figs. 1 and 2, is of the in-and-out batch type in which the quench tank and purge chamber are located in front of the heating chamber. It is designed so that no pits are required and a minimum of floor space is needed.

The furnace proper is heated by gas-fired radiant tubes extending through the rear wall so that all burners are accessible in that one

location. A high volume circulating blower for forced convection heating is mounted in the furnace arch to give active circulation of the hot gases through the charge in a defined path. Rapid recuperation of temperature when a cold load is charged is made possible by the use of heat storing refractories.

The furnace is designed to handle trays or fixtures 24 in. wide, 36 in. long and 15 in. high, or smaller baskets of the same total dimensions. It is arranged to quench the entire load in one operation and, hence, reduce overall cycle time. A double-deck quench rack is used

so that a second load can be charged while the first is cooling in the quenching oil. This arrangement further reduces cycle time.

The quench tank is equipped with high volume circulating pumps, with nozzles located in the tank. This directs the flow of oil down through the

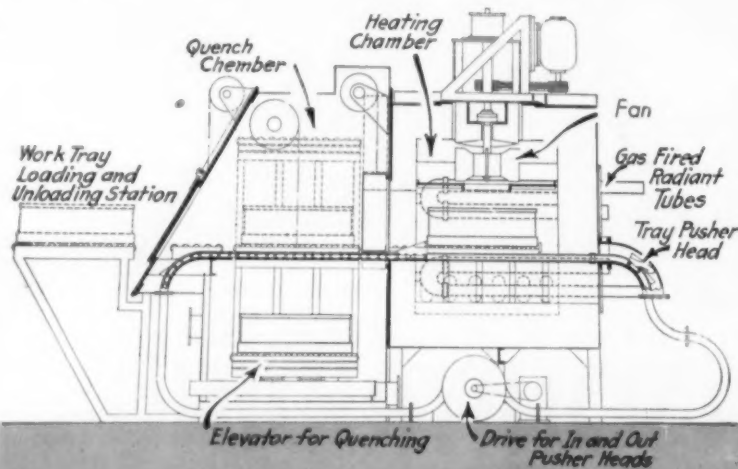


FIG. 2—Cross-section of the carbonitriding furnace as seen from the side. Work is pushed manually into the purge chamber and the balance of the cycle is automatic.

work in the fixture or basket and assures full quenching of the densest loads.

Gravity rollers on the charge table and quench elevator simplify work handling. The work basket is pushed manually into the purge chamber and the balance of the cycle is completed automatically. A non-continuous "snake" chain energized by a variable drive unit under the furnace pushes the loaded basket into the furnace; it then retracts so that no part of the chain remains in the furnace.

When the heating cycle is completed the chain drive reverses direction and pushes the load out onto the quench elevator; the chain retracts and the elevator then automatically lowers the work into the oil. The furnace is completely sealed and arranged for addition of the atmosphere of a neutral carrier gas, natural-coke oven gas and ammonia for carbonitriding.

The atmosphere used in this carbonitriding furnace consists of an endothermic carrier gas, anhydrous ammonia and a natural-coke oven gas mixture. The carrier gas is produced in a Lindberg Endothermic Generator by reacting air and a natural-coke oven gas mixture over a catalyst heated to 2200°F.

An average composition of the carrier gas is as follows: 0.0 pct CO₂, 21 pct CO, 40 pct H₂,

1.0 pct max CH₄, 38.0 pct N₂ and 0.0 pct O₂. The dew point of this gas is adjustable and will vary with the air-gas ratio. The carbon potential of this atmosphere when used for carbonitriding is approximately 0.70 to 0.80 pct.

The cost of producing this atmosphere is approximately 25¢ per 1000 cu ft. This generator requires very little attention when once the desired air-gas ratio is set; however, a regular weekend burn out of the catalyst chamber is carried out to insure uniformity of composition.

Advantages in using an endothermic carrier gas in this process are: (1) Low initial cost; (2) it provides a central source of supply that can be tapped as the necessity arises; (3) it can be used as a carrier gas in gas carburizing; (4) it can be used as a protective atmosphere in neutral hardening furnaces; and (5) elimination of sooting.

Gases Enter Simultaneously

The other component gases used for carbonitriding are anhydrous ammonia and a mixture of natural-coke oven gas. The ammonia is stored in a liquid state in a large, centrally-located storage tank, where it is vaporized and piped to the carbonitriding furnace. The natural-coke oven gas mixture consists of 55 pct natural gas and 45 pct coke oven gas and has a heat content of 800 Btu per cu ft. These gases are introduced simultaneously into the rear of the furnace through a common inlet.

The gas mixture for a hard case consists of 85 pct endothermic carrier gas, 10 pct anhydrous ammonia and 5 pct natural-coke oven gas. The only control exercised over the atmosphere is the checking of the generator ratio and dew point and the dew point within the furnace. This latter check reflects the condition of the furnace tubes and seals. In addition, each heat is examined for case depth and hardness.

Fig. 3 shows the case depth and detailed microstructure of the case in a part made of AISI 1020 steel carbonitrided at 1550°F for 65 min total time, using an atmosphere as described above. The case microstructure contains a substantial percentage of retained austenite at the immediate surface. The hardness of the case is Rockwell 91, 15N scale.

Distortion Is Minimized

The AISI 1010 tube shown in Fig. 4 is a typical light case job requiring 0.005 to 0.008 in. case depth. The gross weight per heat was approximately 560 lb and a net of 245 lb. A total cycle of 25 min from charge to quench was required to produce 0.005 to 0.008 in. case depth at a max temperature of 1580°F. The production rate of this part is 588 lb per hr net. Distortion is within the tolerable limits and is considerably less than that encountered with wet cyaniding.

Fig. 5 shows an AISI 8620 ratchet wrench

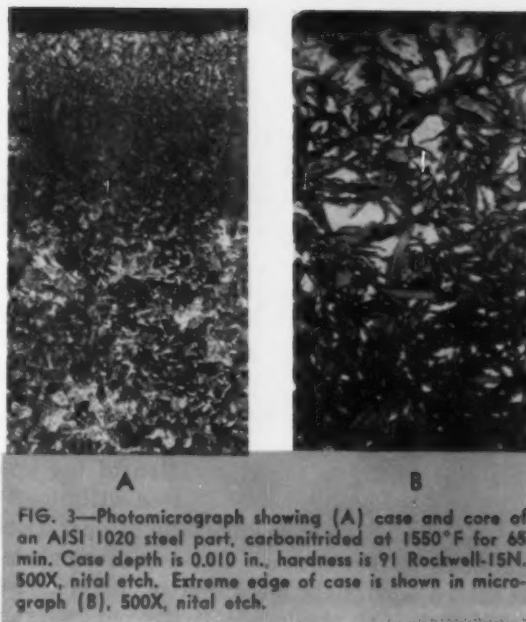


FIG. 3—Photomicrograph showing (A) case and core of an AISI 1020 steel part, carbonitrided at 1550°F for 65 min. Case depth is 0.010 in., hardness is 91 Rockwell-15N. 500X, nital etch. Extreme edge of case is shown in micrograph (B), 500X, nital etch.

handle which is carbonitrided to a case depth of 0.015 to 0.020 in. The parts, ¾ in. in diam and 10 in. long, are stacked vertically and loaded to the capacity of baskets. A net load of 575 lb per heat is run for a total time of 2 hr at 1625°F. The resulting hardness is RA 80 to 81 on the case and RC 30 min on the core.

Eliminates Nicking, Racking

The part was previously processed in a liquid carburizing bath and necessitated racking. This method of handling also made the parts more susceptible to nicking. The carbonitriding process has eliminated both of these problems.

The furnace and auxiliary equipment has been maintained for 2 years at a cost of 40¢ per operating hr. This includes maintenance and repair of baskets and fixtures, oil pumps, radiant tubes and electrical equipment. For a period of 14 months all maintenance was carried on while the furnace was either operating or idling over weekends.

The low maintenance cost is due in large measure to the accessibility of the radiant

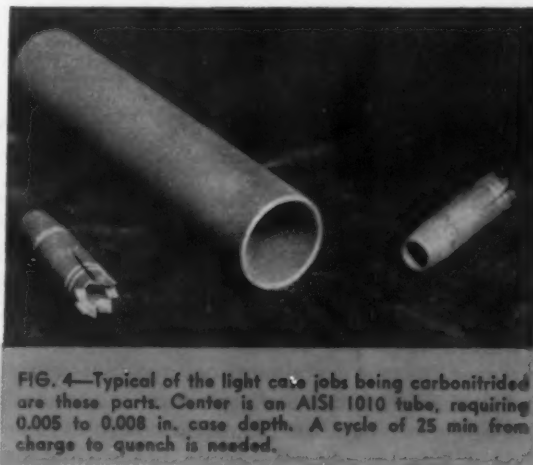


FIG. 4—Typical of the light case jobs being carbonitrided are these parts. Center is an AISI 1010 tube, requiring 0.005 to 0.008 in. case depth. A cycle of 25 min from charge to quench is needed.

tubes, fan, pumps and other components. The heat-storing refractories make it possible to start production early on Monday with a minimum of delay.

The advantages of the carbonitriding process over liquid case hardening methods based on experience of the past 2 years may be enumerated as follows:

(1) The problem of hiring and keeping personnel has been reduced considerably. This has been due largely to the elimination of the unsafe and dirty conditions associated with liquid case hardening methods. The ease of operation minimizes worker fatigue. These improvements cannot be accurately measured in dollars and cents. However, the productivity per worker

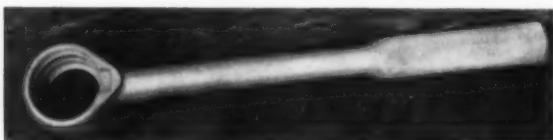


FIG. 5—Ratchet wrench made of AISI 8620 steel and carbonitrided to a case depth of 0.015 to 0.020 in. Carbonitriding has eliminated the racking formerly required.

has been increased by an amount greater than that attributed to the physical differences in the equipment.

(2) The carbonitriding process is safer than liquid processes. Cyanide salts are toxic and must be handled carefully and isolated from other salts that may react violently. In the molten state they produce serious burns when they splatter and all work must be thoroughly dried to prevent explosions. The fuming of liquid salts causes deposits of cyanates and car-

bonates and makes it necessary to provide exhaust equipment, and frequent cleanings are necessary.

(3) Raw material costs per unit of work processed are considerably lower for carbonitriding than for liquid methods. The cost of cyanide to process 100 lb of the tube shown in Fig. 4 is \$0.678 as against atmosphere costs of \$0.047 for processing a like amount in the carbonitriding furnace.

(4) Carbonitriding eliminates the necessity for water or brine quenching, thereby minimizing distortion and the necessity for straightening. Case depth and composition can be adjusted easily to produce a relatively hard case with rates of cooling slower than those produced by oil quenching. The construction and design of the carbonitriding furnace make it extremely efficient from the standpoint of heat losses.

(5) Although the furnace was designed principally for carbonitriding, it has been used for neutral hardening of carbon and alloy steel parts and for carburizing and hardening of plastic molds. This flexibility is of considerable advantage in a shop which cannot guarantee a constant flow of similar material into a piece of heat treating equipment.

(6) Increased production rates in this furnace have eased congestion in the shop and provided room for expansion which was not previously available. In other words, the productivity per sq ft of floor space occupied is greater in this furnace than in a liquid cyaniding bath. Cyanide disposal problems are also eliminated.

(7) Parts previously pack or gas carburized can be processed in carbonitriding equipment, thereby reducing the number of processes and specifications which must be executed. Costly wiring of parts and the use of special fixtures has been eliminated.

New brazing paste saves copper

A new type of copper brazing paste conserves copper and has other advantages for copper furnace brazing operations. It can be applied with more speed and less waste than conventional sources such as rings, foil, slugs and electroplate. As much as 50 pct savings in copper have been reported in the refrigeration and automotive industries where the new paste has been used.

The paste contains a small amount of iron. Its chief feature is reduced fluidity. This con-

tributes to copper savings by reduction of the amount of running from the joint. It also promotes increased joint strength because, being more sluggish, it is easier to fillet joints. Decreased fluidity also permits filling of wider joints. Clearances up to 1/32 in. have been bridged and filled, eliminating many silver solder jobs.

The paste is made by The Glidden Co. with either a water or petroleum thinned base.

Why not spin it?



Using a hardwood stick in breaking down the blank as the first step in spinning an aluminum helmet.

Spinning is an ideal forming method for small production quantities, and finds use in larger production runs of parts which would require complex press tooling. Many materials can be spun, and the method is often used as an operation subsequent to deep drawing. Lubricant selection is important.

Spinning can be defined as the procedure of making sheet metal discs into hollow shapes by pressing a tool against a rotating form (spinning chuck). As a forming method, spinning is ideally suited where small production quantities are involved. This choice is basically economic, due to the minimum outlay involved in the initial investment for tooling and equipment as compared with that in power press work.

Labor for spinning must be highly skilled, resulting in elevated labor costs. However, this is off-set considerable by the tooling expense, which is approx 10 to 15 pct that of power press work. Usually a few days are required to obtain the necessary tools and establish production for spinning as compared with weeks or even months that may be required for press tooling.

Spinning is also used as a method of forming large quantities, especially where the shape of the part is such that press tooling would be quite complex. Also, spinning is employed where the size of the item is beyond the capacity of press equipment available. Since the metal is formed over a chuck rotating in a lathe, spinning is



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limited to symmetrical articles that are circular in cross-section normal to the axis of rotation.

A large variety of materials can be chosen for spinning. Some are quite easily formed without any intermediate annealing operations; other materials will work-harden to such an extent that periodic anneals are necessary for further reductions. Aluminum displays very little work-hardening tendency, as shown in Fig. 1, and could be worked to completion without danger of breakage. Such alloys as Monel, Inconel and 18-8 stainless steel have high work-hardening tendencies and would require intermediate anneals.

In the spinning of the more difficult materials, judgment as to the extent of cold work permissible prior to an anneal is often entirely up to the

spinner; he determines by "feel" whether the material needs an anneal.

Within the aluminum alloy field, 2SO aluminum is the most easily spun; 3SO aluminum is next in preference, used where greater strength is required. In most instances, both of these alloys can be worked to completion without any intermediate annealing. However, alloy 3SO involving difficult spins may require annealing. Where annealing is required on the non-heat treatable alloys such as 3SO and 52SO, judicious spacing of this operation is necessary so that the desired hardness in the completed spun part can be obtained in the subsequent operations.

Temper Choice Varies

Heat-treatable alloys such as 53SO and 17SO are spun occasionally, but they require more frequent anneals. When it is necessary to heat these alloys after all forming is completed, it may be advisable to size immediately on a spinning lathe to eliminate warpage that may have been caused by the drastic quench. With some alloys such as 17S or 24S, the allowable time period between heat treatment and sizing may be very critical.

In the spinning of deep and complex shapes, it is necessary to specify soft temper; where relatively shallow shapes are involved, it may be permissible to use either $\frac{1}{4}$ or $\frac{1}{2}$ hard temper; $\frac{3}{4}$ or full hard material is not recommended for any type of spinning. There are no rigid rules; the selection of temper must be based on such factors as the depth, diameter, shape and general character of the spinning.

Copper and copper alloys such as gilding metal, commercial bronze, red brass, yellow brass, and the nickel silvers are very common spinning materials. The choice of alloy is usually dependent to a large extent on the color desired in the finished spun part. In some instances, however, the mechanical properties of the specific composition are the controlling factor for choice.

Complex Mg Shapes Need Heat

Electrolytic tough pitch copper is used extensively for electrical appliances due to its heat conductivity; red brass is the most easily spun of the copper alloys and is slightly preferable to yellow brass. In all cases, preference is given to soft temper sheet stock which has been annealed to a grain size between 0.15 to 0.30 mm.¹

Revere magnesium, type AN3SO or Dow type MA or equivalent are the easiest to spin.² Type AMC52S or FS-1 or equivalent are slightly more difficult to spin, but the strength of these alloys is greater. As with the copper alloys, the soft temper annealed sheet is the most economical choice. The spinning of these alloys at room tem-

peratures is generally limited to shallow parts that do not require small-radius bends.

Where more difficult shapes are encountered, heat application on either the material to be spun or on the chuck is essential. Under these conditions, magnesium alloys can be spun as readily as any other material. Spinning temperatures usually approach 600°F.

Both the lead-containing pewter and the more modern composition containing from 5 to 15 pct Sb and approx 3 pct Cu are readily formed by spinning. However, care must be taken to apply pressure continuously³ in order to avoid rupture

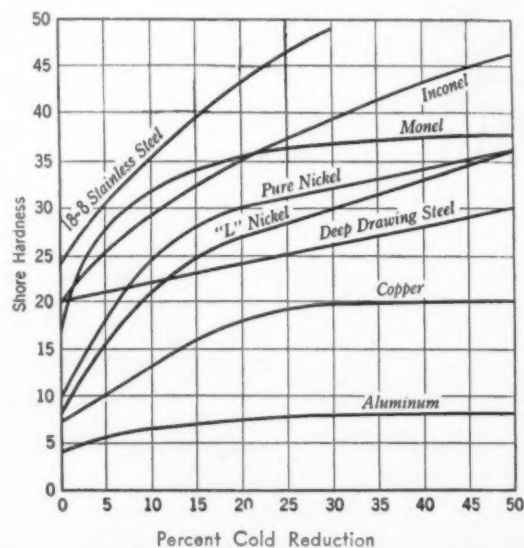


FIG. 1—Increase in hardness of various metals and alloys with cold working. Courtesy International Nickel Co., Inc.

while the metal is being stretched. Fairly heavy stock should be used. A uniform thickness can be readily maintained during spinning, and intermediate annealing is not usually required. Several compositions of pewter soften under severe work; some hardening can be secured by heating the spun part to 300° to 390°F.

Zinc and zinc alloys can be spun readily without any intermediate annealing. Difficulty may be experienced when the forming temperature is lower than 70°F. A general practice in softening wrought zinc is to immerse it in boiling water.

Stainless steels are used quite extensively in spun parts. They work-harden quite readily and require more frequent intermediate anneals than other materials. This is especially true of the standard type 302 stainless. It is suggested that the higher nickel type 305 be employed where greater reduction in a single operation is desired. This free-spinning composition reputedly permits from two to three times as much deformation as type 302 before annealing is required. Ten gage or 9/64 in. in thickness is regarded as the maximum for spinning type 302. In mild steel, spinning can be accomplished up to 7 gage or 3/16 in. in thickness.

Those stainless compositions that contain

chromium as the single alloy (type 430 and 410) have not been too successful as spinning materials, especially when the composition contains 17.0 pct Cr or more. Reductions are less and more anneals are usually required. For best results, the stainless composition should contain ⁴ from 12.0 to 16.0 pct Cr.

Highly alloyed materials such as nickel, Monel and Inconel work-harden very similarly to the austenitic stainless steels, but not to as great an extent. These metals are as ductile as the softer metals when in the annealed condition, but greater pressures are required for deformation. Intermediate anneals are also required. Of interest is a special grade of carbon-free nickel known as L nickel, which is better adapted to difficult spinning designs⁵ than either nickel, Monel or Inconel sheet.

The basic requirements for spinning are a lathe of suitable design, forming tools and spinning chucks. A variable-drive lathe where speeds range from 1200 to 2400 rpm is preferred. In some instances, however, spinning speeds may



FIG. 2—Sectional chuck used in forming a narrow throat or on other parts involving complex designs. Extreme care is needed to fit sections closely.

be as low as 300 to 450 rpm; this is the recommended range for spinning magnesium circles of 15 to 25 in. diam.⁶ In general, the lower speeds are used for large and thick sections where heavy pressures are required.

Where items of large diameters are spun, the lathe bed is cut away to provide the necessary swing. Some spinning lathes will swing diameters up to 6 ft or over, although diameters from 1 to 30 in. are more common. In spinning the tougher, higher strength materials, the greater pressures needed for deformation require equip-

ment with heavy bearings and adequate provisions for end thrust.

The chucking material best suited for an operation is dependent upon the length of the production run, size or shape of the spun item, degree of surface finish and dimensional tolerances desired. Wood is often employed as a chucking material for short production runs, but cast iron or steel chucks are more frequently employed. Other types of chucking material used are composition board, masonite blocks, aluminum or magnesium metal forms, or wood forms covered with a spun steel shell.

Metal Chucks Are Best

Wood makes an inexpensive chucking material for the production of experimental items or in the establishment of spinning sequences. Close tolerances cannot be expected. Wood chucks are also subjected to marked thermal and humidity changes which seriously affect their life.

Hard nickel-chromium cast iron or steel chucks are preferred for long production runs, close tolerances, or where surface finish is of extreme importance. An alloy cast iron containing approx 3.0 pct C, 2.5 to 3.0 pct Ni, 0.75 to 1.0 pct Cr and 1.2 to 1.5 pct Si, heat treated to maximum hardness, makes a satisfactory chucking material. Metal chucks are sometimes chromium plated to provide an extremely smooth surface. Where steel is used as the chucking material, a tool steel with from 0.90 to 1.10 pct C is usually selected. Where minimum distortion is required, or where the design is quite complex, an air- or oil-hardening composition is employed.

Compound Chucks Require Care

Steel chucks are almost essential for working the high strength spinning materials, and for softer metals where the design involves such steps as breakdown, cupping and finish spinning. Aluminum or magnesium chucking is preferred for spinning magnesium. Where the design is quite complex, containing a narrow throat, solid chucking is replaced with sectional chucking, as shown in Fig. 2. Extreme care is needed to fit all the sections perfectly; otherwise the impression of the joint may show on the spun part.

Due to the pressures exerted during spinning, special tools are necessary. Advantages are gained by the use of the compound-lever tool or roller tool, operated by a screw.

Both alloy and carbon tool steels are used as tool materials for spinning copper, nickel silver, brass and aluminum; the tools must be of maximum hardness to resist both wear and abrasion. Bronze spinning tools are used for manual spinning of stainless steel. Alloy steels result in a "welding" action during spinning. For spinning Monel, Inconel and nickel, tools should be broader and flatter than those normally used for softer

materials, to distribute plastic flow over a greater area and reduce overstraining.

Avoid Reworking Same Surface

Spinning may vary from a simple one-chuck operation to a multiple procedure. A typical sequence may comprise breakdown, cupping and finish spin; chucking is made with the calculated spring-back of the material spun. In most instances, the work is laid down firmly on the chuck with long powerful strokes. Reworking over the same surface should be avoided as much as possible, especially on materials having a high rate of work hardening.

Aluminum can be spun from two to four times as fast as any other ferrous or nonferrous metal. Where the diameter is to be greater than that of mill stock, strips of aluminum may be butt welded and then spun.⁷ This method is also used when large rings, collars or sleeves are desired, since the center metal would be lost if a solid sheet was used. In spinning the high nickel materials, a speed approx $\frac{1}{2}$ to $\frac{3}{4}$ of that used for spinning the same shape from softer metals is employed.

Lubricant Choice Is Important

Straight chromium stainless types 410 and 430 are spun at about $\frac{2}{3}$ the speed used for plain carbon steels; annealing is required at about $\frac{1}{3}$ the intervals for plain carbon steels. The 18-8 austenitic stainless is spun at from $\frac{1}{4}$ to $\frac{1}{2}$ the speed used for copper. Austenitic stainless cannot be spun to the depth obtainable with softer metals.

Proper lubrication is essential for successful spinning; the lubricant should be heavy-bodied to withstand the high pressures and temperatures encountered during shaping. Wherever possible, the lubricant should have the facility to clean well; this factor becomes more important where the old type batch immersion cleaning is replaced with modern continuous spray cleaning facilities. Some of the recommended lubricants are difficult to remove other than by elaborate and costly cleaning methods, but they have been found excellent for the material specified. Deviations in lubricants must be made on the basis of individual experimentation.

Tallow, vaseline, lard oil or mineral oils in various combinations form the basic lubricants for spinning aluminum alloys.⁷ The lubricants are applied either by brush or rag wad. Tallow or soap-oil mixtures are commonly used in pewter spinning; laundry soap or a mixture of paraffin-tallow is the usual lubricant for magnesium alloys, except in spinning special shapes which require high temperatures. In such instances, a graphite-tallow mixture is usually applied.

For copper and copper alloys, lubricants such

as lard oil, soap, beeswax, paraffin or mixtures of these compounds are employed. After considerable experimentation, a paste type water-soluble lubricant diluted with paraffin oil (1 part oil to 7 parts paste) was developed. This proves satisfactory from the cleanability standpoint, and withstands the heat and pressures exerted in spinning.

Lubricant Can Cause Carbides

The lubricant for spinning stainless steel should be applied generously to prevent scoring or abrading. An oil-bearing lubricant should be used for spinning heavy stock.⁸ In spinning light gage material, yellow laundry soap has proven quite satisfactory, and water soluble lubricants may be found applicable. White lead and linseed oil mixed to a heavy paste consistency is excellent but extremely difficult to remove.

The complete removal of lubricants after spinning and prior to annealing cannot be stressed too strongly when working with the austenitic stainless steels. If the lubricant is not removed, serious intergranular carbides will occur, resulting in a substantial loss of corrosion resistance. Also, where either brass or bronze spinning tools are used, a nitric acid pickle should be made prior to annealing.

Even small amounts of copper will penetrate the metal during annealing and cause cracks. Fig. 3 indicates the type of failure that occurs when pickling is not carried out. When cracked shells are pickled after annealing, partial disintegration by the pickling acid results, as seen in Fig. 4.

Spun stainless shells should be handled with clean gloves after cleaning to prevent grease smears or fingerprints which may be burned into the surface during annealing. It is also recommended that annealing follow promptly the spinning and cleaning cycles.

For higher nickel alloys such as Inconel, Monel and nickel, yellow laundry soap is used most frequently. Beeswax, tallow or a mixture of the two are also satisfactory. As with stainless steel, complete removal of lubricant is essential prior to annealing. Lubricants containing lead or sulfur should be avoided if the spun parts are to be annealed, since these elements have a definite embrittling effect. Tool friction has been successfully reduced on the spinning of very difficult shapes by putting a flash copper plate on the material to be spun.

Spinning Offers Flexibility

There is a definite economical limitation to spinning as regards interchangeability; tolerance limits exist, since spun articles are virtually hand made. In spinning aluminum, a tolerance limit of $\frac{1}{32}$ in. is regarded as the most economical.⁹ Closer tolerances can be obtained by highly skilled spinners using steel chucking and light gage material.

Metal can be spun into concave or convex shapes, vessels with reverse curves, and into narrow-necked containers. It is also possible to spin either oval or octagonal shapes, using spinning lathes with cam-operated chucks specially designed for the purpose. Round or rectangular beads may be incorporated and angular surfaces may be introduced into the product at will. However, the more complex the shape becomes, the greater will be the cost of spinning and the greater should be the experience of the spinner. Economically, each contour line should be symmetrical with respect to all other contours in the item.

Embossed ridges can be spun as close as 1/16 in. to one another in aluminum alloys. With the most commonly used material such as aluminum 2SO alloy, 0.040 in. in thickness, ridges should approximate 1/4 in. in width for greatest economy. Radical changes in contour add to the expense of spinning. However, with aluminum alloys, changes in contour of 90° and upward are quite common.

Use Sufficient Chucking

Stress factors normally associated with other materials are not present in magnesium alloys because most complicated shapes are spun at elevated temperatures. As with most metals, the edge of the magnesium sheet should be filed clean before starting the spinning⁶ in order to minimize the possibility of edge cracking.

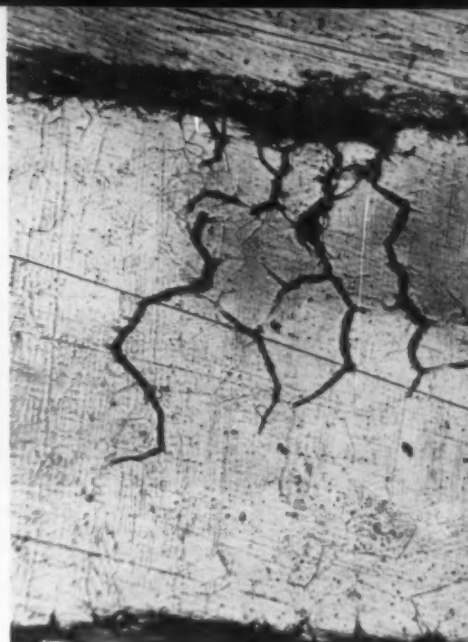
With Monel metal, an increase in height of 1 to 1 1/2 in. constitutes one operation when the spinning is done with a bar tool. Where mechanical spinning is employed, about twice the depth can be obtained. In the early stages of nickel and "L" nickel spinning, it is usually possible to spin twice and sometimes three times the depth of a Monel operation before annealing is required.

In a sequence of operations where insufficient intermediate chucking is provided, the material is subjected to a large degree of cold work. With the high nickel alloys, this condition may result in either spinning a "knuckle" or pulling the material to form a pebbled surface. It is practically impossible to smooth out the former, or to correct the latter by annealing. High nickel alloys will not stretch as much as the softer metals during spinning; slightly larger blanks are therefore necessary.

Spinning is often used on stainless steel as an operation subsequent to drawing, either to perfect contour or to form odd shapes, necks, special flanges and beads. Because of its tendency to harden through cold work, stainless requires considerable power to spin and may wrinkle along the edges. This can be prevented to some extent by turning up a flange on the edge of the blank and working the center metal first.

Care must be taken to prevent stress cracking

FIG. 3—A flash pickle prior to annealing would have removed brass deposited by the spinning tool from this type 302 stainless steel and prevented the intergranular failure shown. 125X.

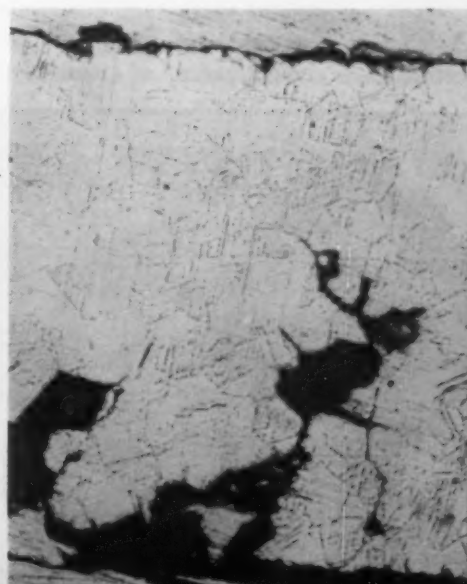


when working stainless. Leaving 1 or 2 in. of unworked rim metal until spinning is near completion will aid considerably in combating this condition.

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FIG. 4—Disintegration caused by pickling directly after annealing, with intergranular weakness due to foreign material from the spinning tool and aggravated by the anneal.



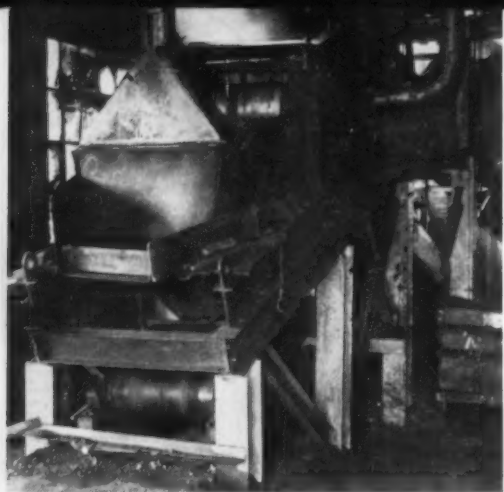
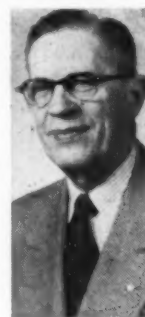


FIG. 1—Simplicity machine for crushing lumps of core sand and screening the sand saves about 400 tons of sand a day in the Buick foundry, besides greatly reducing haulage charges to dumps.

Foundry Innovations

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Close study of almost every operation in the Buick gray iron foundry has led to a host of simple changes in methods and equipment. These have yielded economies quite out of proportion to the cost of the alterations; they contribute materially toward making unit costs in this foundry lower than in any comparable General Motors operation.

Only a few of the changes have involved substantial investment and all have amply justified the costs of the changes. Most of them are of a type adaptable in almost any high production foundry. All the practices are not completely new to the industry, but even those that may be paralleled elsewhere could be used to advantage in uncounted cases.

In many foundries, for example, lumps of sand, especially those from cores that do not break up in shakeouts or in screening, are discarded and carted to dumps. Buick now saves about 400 tons of sand a day by running such lumps through the Simplicity crusher and screening setup, Fig. 1, and returning the useful sand by a belt conveyor to sand storage and mulling equipment. This not only reduces new sand requirements by the amount recovered but saves the cost of trucking the lumps to dumps.

For convenience and economy, Buick uses a minimum number of standard-sized flasks. Some

patterns, however, are so big that space is left when they are used in a standard flask. In such cases one or more small patterns are added to match plates (along with suitable gating), and extra castings are produced without making extra molds. In general, the extra castings then cost only as much as the extra metal used. In some instances, it may be necessary to pick them from the drag by hand before the drag reaches the shakeout. Savings are then somewhat less than otherwise, but are still well worth while.

Handling Is Simplified

Dynaflow transmission bell housings are among castings produced in large quantities. Drag halves include a dome-like green sand core. They formerly were made in rollover machines at the rate of 50 per hr. The rate has now been stepped up to 120 per hr by using an Osborn No. 1021 jolt-and-squeeze machine from which the drags issue in inverted position. They are then picked up by a bail, as shown in Fig. 2, and rolled over before being set on the casting conveyer. In this case, the drag employed has a permanently fastened sturdy steel basket-like framework that is embedded in and supports the green core. When the drag reaches the shakeout, the sand is readily shaken free.

After molds are poured, they continue on the conveyer through a cooling tunnel to a point where the castings have completely solidified and the copes can be lifted off. This operation was formerly performed by two men who used a hoist to lift the copes, swing them over a shakeout and lower them into the latter. It was found, however, that one man using only a bar could easily roll the cope off the drag. This is done under a dust collecting hood. The cope drops onto a belt conveyer, arranged on an incline at a sharp angle to the cooling line conveyer, and the belt delivers the cope to the same shakeout used before. This



FIG. 3—Air-operated ram is controlled by valves operated automatically by drags as they advance on the conveyer. Drags are pushed from the conveyer into a shakeout.

produce big savings

Simple expedients help reduce labor costs and reduce waste at the Buick foundry. Novelties in cleaning cut time besides making castings better adapted to machining and service requirements. Manual handling is kept at a minimum.



FIG. 2—By substituting a jolt-and-squeeze molding machine for one of the rollover type, 120 drag molds for transmission housings are made per hour as against 50 before. Rolling over is done in the bail that transfers molds to the pouring conveyor.

simple arrangement saves one man and eliminates the hoist.

When copes have been removed in this manner, the drags holding the casting, which is still at red heat, continue through a cooling tunnel until the casting is at a temperature suitable for removal and is picked out. Drags, still holding most of the sand, continue on the conveyor until opposite the shakeout into which they have to be pushed. This transfer is effected by an air-operated ram.

Until recently, a man stationed at this ram operated the valves to make the ram advance and retract. The valves are now arranged for automatic operation by means of a pair of gates, illustrated in Fig. 3. The gates swing on levers having horizontal pivots when the gates are pushed along by the drag as it advances on the conveyor.

As each drag moves the first gate, it opens a valve and the ram retracts. Further motion of the drag causes it to clear the first gate and the latter drops back to its prior position. The drag continues on the conveyor until it is centered opposite the ram, at which point the second gate is operated and opens the second valve, causing the ram to advance and push the drag into the shakeout. As this occurs, the second gate drops back to vertical position. This cycle repeats automatically as each drag comes opposite the shakeout. After drags are shaken out, they are advanced

onto a roller conveyor having driven rolls and are moved onto a belt that returns them to the molding conveyor for use in a new cycle.

Large castings picked from molds are sorted after shakeout and are routed through the cleaning department. Castings of medium size are also hand-sorted in a pickling line. Certain small castings, most of which are made in large quantities, are sorted automatically in a squirrel cage setup, Fig. 4, after gates are removed. These castings are fed along with small pieces of scrap and some lumps of core sand onto the inclined belt conveyor, which empties into the Simplicity machine at upper center of Fig. 4.

Reduces Hand Picking

At the high point of the belt is a magnetic pulley. This does not affect the sand lumps, of course. They spill into the Simplicity machine and are carried under floating disk rolls that crush the lumps. The sand is then screened, the finer particles falling into one tote box and the coarser into another. Castings and other iron continue around the pulley in contact with the belt until they are demagnetized and drop into a chute which delivers into the squirrel cage.

This cage is about 13 ft long, 20 in. ID and is divided into three sections, each made from bars disposed parallel to the axis of rotation. In the

FIG. 4—Combination setup of a core sand crusher and screener with a squirrel cage that automatically sorts three small castings and separates scrap.



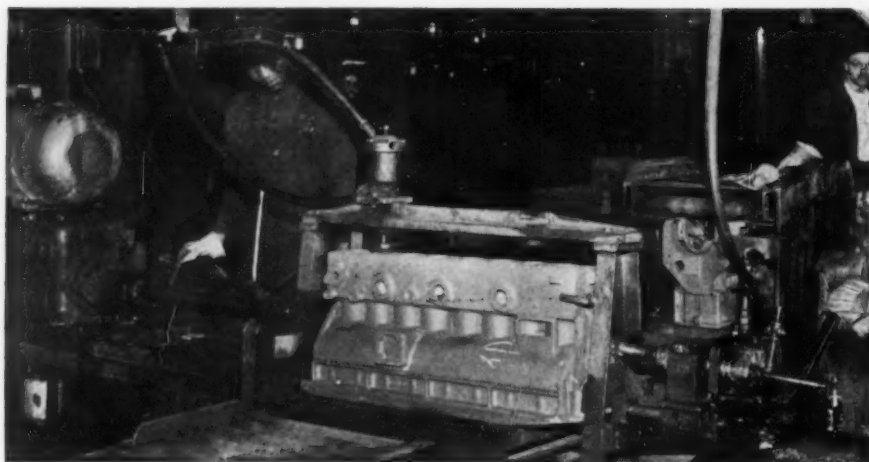


FIG. 5—Air-operated rollover, left, saves two men. One less is needed for reaming fins from camshaft bearing holes, because reamers are now power-operated in the setup shown.

FIG. 6—Core sand residue (right) is removed from the jacket space in each cylinder block by admitting an air-water mixture at 100 psi pressure.

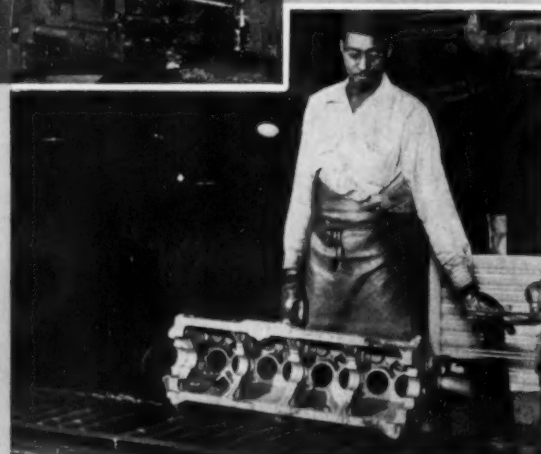
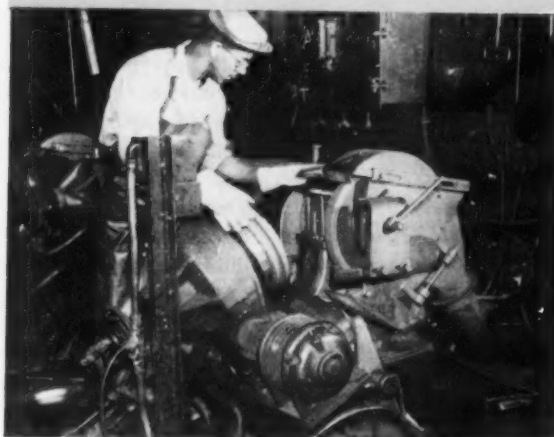


FIG. 7—One of the semiautomatic-machines (left) that grind the chilled fins from brake drum castings. Work pieces rotate slowly as they advance into grinding wheels. One man tends two machines.

first section, the bars are so spaced that only gates, fins and the smallest castings fall through and drop into a tote box. Bars in the second and third section are spaced proportionately farther apart and let different-sized castings drop into other tote boxes. Larger castings and pieces of scrap too large to pass between any of the bars drop from the end of the cage into a fourth tote box. The cage is tilted 5 in. in its 13-ft length and rotates at about 9 rpm. Occasional pieces of scrap catch between bars and have to be removed by hand at long intervals; aside from this, the setup is automatic and requires almost no attention except to change the tote boxes as they are filled. The time of two men otherwise needed on the picking conveyor is saved.

In the cleaning department, cylinder blocks are passed through grit blasting on an overhead chain and then have top and bottom surfaces rough ground. The blocks are then passed along a roller conveyor bottom up while some hand snagging is done. When blocks reach the station shown in Fig. 5, they enter an air-operated rollover that automatically turns them so that the bottom face is down; this eliminates two men that formerly turned the blocks over.

From the rollover, blocks are advanced onto the turntable (center, Fig. 5) which is then turned transversely and locked by an air ram under a fixture. This brings the camshaft bearing holes in line with two high-speed steel reamers. One of these is at the end of a long bar and is gear driven. To advance this head and reamer, the head is mounted on ways and attached to a rack moved by a pinion turned by a hand wheel.

Mechanical Reamers Clear Holes

As the reamer is fed in, it removes fins from all camshaft bearing holes save that at the right end, which is of smaller diameter, and then is withdrawn. The small hole is cleared by an air-driven reamer pushed in by a hand lever, extreme right in Fig. 5, operated by a second man who also aids in loading and unloading the fixture. Formerly, the holes were cleared by hand-operated tools and three men were required as against two now needed.

Further along the conveyor, blocks reach the station shown in Fig. 6. There the block is laid on its side over a fixture connected to a line that admits an air and water mixture under 100-psi pressure through a jacket space opening. This

mixture traveling at high velocity washes any remaining core sand out of the jacket space. The water and sand fall into a sump from which the sand is removed by a bucket conveyer and dumped into a tote box.

Block castings are then tilted back onto the roller conveyer and move to a station where each is elevated by an air lift and is gripped by an ice-tong carrier on a monorail chain conveyer that transfers the blocks to a storage department. Tong carriers grip the blocks securely under a flange the moment that the air lift is lowered to pick up the next block.

When blocks reach the storeroom, the chain moves down an incline above a part of another roller conveyer. As the rollers take the weight off the tong carrier, the supporting angles of the latter are spread by side cams that contact U-shaped extensions provided to disconnect the tong arms from the block. This leaves the blocks free to move down a roller conveyer incline to a storage area and the tong carriers continue along the chain loop to pick up new blocks. The setup requires only one man to shift blocks from the cleaning department's roller conveyer to a chain conveyer and to land the blocks on another roller conveyer in a storage area. This man does no lifting and need only see that the tong carriers advanced by the chain are guided into such position that the carriers take the weight of each block as the air lift is lowered.

Although the major output of the Buick foundry is sand castings, it includes a department in which brake drums are cast centrifugally in metal molds and in so doing, are made integral with supporting stamped flanges. The output of this department is high and provisions for rapid cleaning have to be made.

Cleaning of the drum castings consists in grinding off the chilled fins that form around the open end of each drum. Because the number of drum castings to be ground is so large, a battery of special machines, one of which is shown in Fig. 7, is employed. These each include a standard grinding head. The work holder is special and, after hand loading of one drum at a time, rotates the drum slowly as it is fed into the wheel by an air ram that rocks the work holder about a pivot near the floor.

When the drum casting is fed to the required depth for grinding off the chill, the holder automatically withdraws to loading position and stops for unloading and reloading. At each feeding, the direction of work rotation is automatically made the reverse of that in the prior cycle, so that grinding wheels will wear uniformly at each edge. As the grinding cycle is automatic, once the holder is loaded and started, one operator can tend two machines, loading one while the other is making its grind. Thus, one man handles 170 drum castings per hr and the labor cost per grind is low.

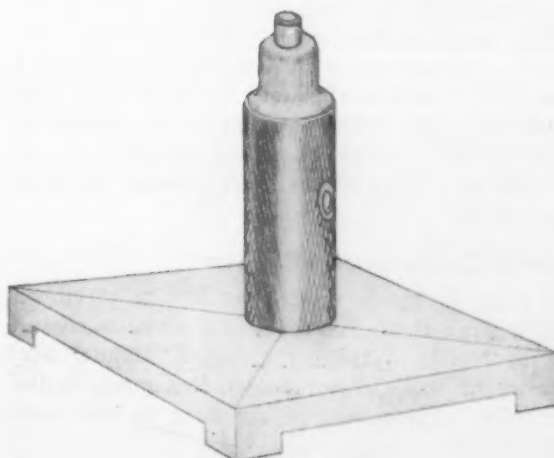
Device aids accurate center punching

Accurate center punching at the intersection of two lines is more of an art than a science. Some find the required degree of skill rather difficult to acquire. The simple device illustrated, properly made and used, will help compensate for lack of skill in this operation.

It is made with a perfectly square, flat base having sharp 90° corners. In use it is set on the work and shifted until its four corners fall on the intersecting lines scribed on the work. Then a light tap on the integral center punch will make an indentation precisely at the line intersection.

The base is made from a piece of flat steel milled so as to leave a triangular foot at each corner. It is also milled to be perfectly square, with the corners sharp and true. Diagonal lines from this base are scribed from the corners and will intersect at the exact center. A hole is drilled and tapped at this point.

The handle is threaded to fit this hole, and is axially drilled to receive the punch. A small radial hole drilled and tapped in the handle holds a screw for retaining the punch. A slot in the side of the punch allows for enough axial move-



ment for the punching operation, though the punch cannot drop out of the handle. The punch is ground to make a fairly firm slip fit in the handle. Removal of the retaining screw permits ready removal of the punch for regrinding of its point when necessary.

WELDING REPLACES SOLDERING and

High-production welding setups and fixtures can ease some tin procurement problems. At Delco-Remy, standard welding machines were used in most cases, modified or specially equipped in this manufacturer's plant.



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Engineers of Delco-Remy Div., General Motors Corp., have concluded that welded joints, or those termed "braze-welds," are preferable to most other types. Included are joints made by soldering and tubular riveting, except where the joints may have to be broken for servicing work. These conclusions apply particularly to the type of starting, lighting, ignition and related equipment that the company makes in large quantities.

In the setup illustrated in Fig. 1, a copper wire from a starter motor solenoid is braze-welded to a copper terminal. The parts are placed in contact in a fixture between the air-operated, molybdenum-tipped alloy electrodes of a bench-type welding machine. A silver alloy ribbon, 0.003 in. thick and $\frac{1}{8}$ in. wide is fed into the joint from a reel by the operator, who turns a thumb screw to advance the ribbon and to pull it back as the weld occurs and the ribbon burns off. Like the molybdenum tips on the electrodes, the purpose of the ribbon is to increase resistance at the weld, raising the temperature.

Small Consumption of Silver

There is only a small consumption of ribbon in making these joints and the silver is alloyed with copper in the parts joined. Manual dexterity of the operator contributes much to the rapidity of this welding, resulting in 500 welds an hour.

The same rate is also attained with the setup used to weld the copper ground wire of a wound coil to the flange of its spool, the flange being zinc-plated steel $\frac{1}{32}$ in. thick. For this job, a dual-head, series-type welder is employed. The smaller electrode, right in Fig. 2, is molybdenum-tipped and presses the wire against the flange to effect the weld, while the dummy electrode is

pressed against the flange at a closely adjacent point. A brass alloy is produced at the joint.

The arrangement used to weld a channel bracket to two split tubes is unusual in several respects, even though the welds are of the conventional projection type, steel to steel. The tubes are set concentrically over an arbor, which is the horn of a welder laid on its back to position the horn vertically. As Fig. 3 shows, the bracket is held between spring plungers against what would be the top electrode if the machine were in its normal, vertical position.

Automatic Cycle Used

When the operator has set the three parts in place, he starts the machine and it runs through the following cycle automatically: (1) An arm swings in; its inner end centers above the horn and lowers, pressing the split tubes down against seats; (2) shoes at each side of the tubes close and contract the edges around the mandrel or horn, bringing the edges at the splits together; (3) the head holding the bracket advances, pressing the four bracket projections against the outer tube. Four welds result; and (4) as soon as the welds are made, the head withdraws and a gripper transfers the assembly to a chute leading to a tote box. The automatic cycle and the supply chutes feeding parts close at hand make it possible to produce 450 of these assemblies an hour.

A simpler and much faster projection welding job is done in one of the 150-kva, dial machines built to Delco-Remy design. The two circular stamped plates and turned hub shown in the center of Fig. 4 are assembled. Three projections are previously formed for the purpose in each plate, both of which are otherwise flat. These projections are spaced 120° apart near the center and the plates have to be so placed

increases production

that welds joining them are staggered with those that join the lower plate to the hub. The welds occur 60° apart in the finished assembly.

Ten fixtures holding the parts are supported in pairs on the solid copper dial which is indexed automatically through five stations in making one revolution. The two welding heads (left in Fig. 4) are in series and are spaced, so that the two sets of three parts loaded by hand in each fixture comes, at the welding station, directly under the two large cylindrical electrodes. When they are lowered, current passes through one set of parts, through the fixture and copper dial and thence through the second fixture and its set of parts to the other electrode. Twelve welds result each time that two sets of parts are indexed under the welder heads.

Unloading Is Automatic

After a pair of assemblies is welded, the electrodes retract and they are indexed to the unloading station (right in Fig. 4). Air-operated grippers lift the two work pieces and swing them over to a chute, where they are dropped.

Following the unloading, the fixtures are indexed through two stations at each of which an operator sits. Parts are taken from boxes spotted close at hand and loaded over brass pins provided on the fixtures. The hub-like part has a conical central hole that rests on a mating pin, while the holes in the plates register with other locating pins.

Except for loading, operation of this machine is completely automatic, including the timing of indexing and other operations. As a result, the machine produces 1000 assemblies an hr. Because a series machine is used, there are no sliding contacts. These might be a source of trouble in a machine carrying the high current used.

Assembled on Chain Conveyor

Special indexing chain conveyers are used for the assembly of the electric horns made in this plant. These conveyers move around a horizontal loop, passing through many stations at most of which one or more specified operations are performed. One of these stations is devoted to welding.

As the setup is such that the points where welds are made are hidden, this setup is not illustrated. These welds faster one pole wire to one clip and two wires to another, both clips being zinc-plated steel. Four air-operated, molybdenum-coated electrodes are used, with two positioned horizontally and two vertically. Two

FIG. 1—A silver alloy ribbon is used to braze-weld a copper wire from the coil, upper right, to a copper terminal. The ribbon is fed in and retracted by a knurled knob, visible at left center. This setup performs 500 welds an hour.

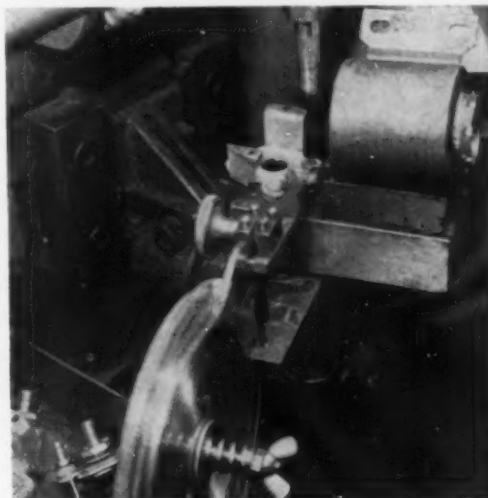


FIG. 2—A two series electrode, the one on the left is a dummy and the other is molybdenum-tipped. A copper ground wire from the coil is welded to the zinc-plated steel spool flange in this setup.

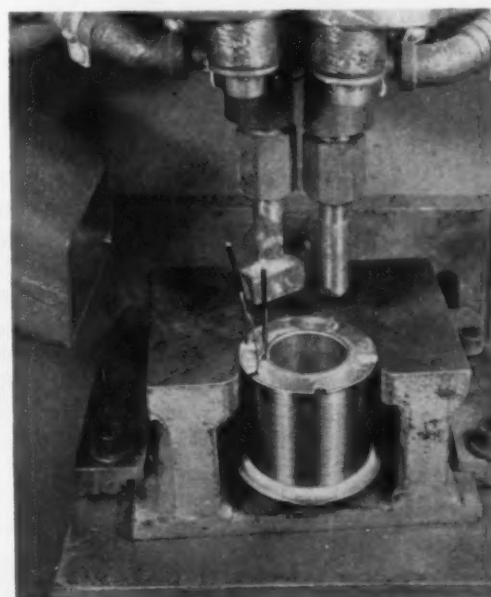


FIG. 3—Two split sleeves are centered over this welder's horn, pressed together and then projection welded at four points to the channel-shaped bracket.



welds are made on each of about 500 horns an hour.

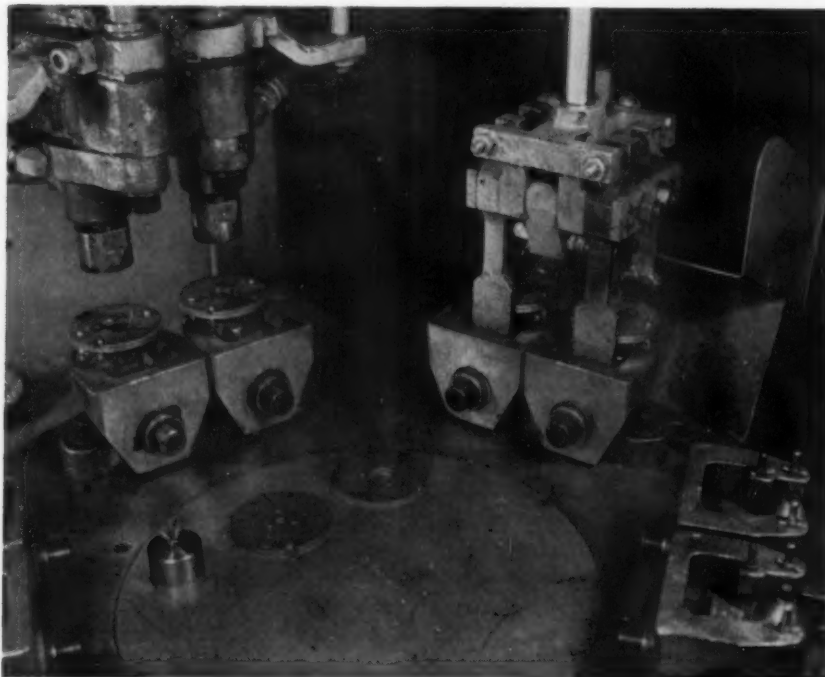
Horns go next to the setup shown loaded in Fig. 5, a 100-kva welder being used. Before making the welds that fasten pole pieces to base clips, a feeler gage is inserted to set the gap between the armature and the pole at the correct width. Then the assembly is turned over and set so that the pair of fixed terminals of the welder is between the clips that are to be welded to pole pieces.

Four Welds At a Time

A lever with a rubber pad at its end clamps the assembly in place, after which air cylinders rock the four movable electrodes inward so that four projection welds are made at one time. Electrodes have Class 2 alloy tips. In this setup, 2000 welds are made per hour. After each set of welds, the electrodes retract, the work is unclamped and lifted out by hand.

Stamped distributor plates, Fig. 6, require that a small cyanide-hardened bearing having a flange be fastened in a hole after the plate is set over the hollow hub at one side. In some cases, stamped springs, one of which is shown resting on top of the upper electrode along with a bearing, have to be fastened between the bearing and the plate. Formerly, the hub was spun over, but this required that the hub be left soft, hence it had to be copper plated before cyaniding.

FIG. 4—On this copper indexing dial, two stamped distributor plates and a hub are welded, two sets at a time, under the series electrodes. This equipment turns out 1000 of these assemblies an hour.



The assembly is done in a standard press-type welder, but the hub is not welded. It is merely heated enough to be upset and expanded around the hole by the 900-lb pressure applied when the upper electrode is forced down. This is more or less equivalent to hot riveting, but the bearing portion below the plate is not heated and remains hard, as desired. Assemblies are made at the rate of about 700 an hour, or about the same as for spinning. However, the saving effected by not copper plating a section of so small a piece is important.

To do this job, the hardened steel bearing, which is a screw-machine product only 9/16 in. long with a 3/8-in. diam at the flange, is set with its lower end in a hole in the lower electrode. This is done before the plate and clip are placed in position over the end to be upset.

Two Upsetting Jobs Done Simultaneously

A similar upsetting job is done two assemblies at a time in a welder whose electrodes are in series. In this case, two copper-plated mild steel rivets are applied, one to each of two stampings. Before fastening the 1/4-in. diam rivets between two hub-like extensions, each rivet has a tungsten contact brazed to the end of the hub that is not to be upset. With the contact, the piece is only 1/4 in. long overall, about half its length being the 3/32-in. shank or hub. This section of the part is upset after the rivet, placed in hole in the lower electrode, has its shank passed through a hole in the stamping.

The fixture used for this job is on a slide and moves forward automatically for loading with a rivet and a stamping at each side. When loaded,

the starting button is pressed and the slide moves back to welding position, the two upper electrodes closing to heat and upset the two shanks. After upsetting, the upper electrodes retract and the assemblies are air-ejected into a chute. Some 1400 assemblies an hour are produced.

Two pairs of flat, hook-shaped stampings are projection-welded at a time to produce a counter-weight assembly used in Chevrolet ignition distributors. This job is performed in a machine similar to that shown in Fig. 4, using the same make and type of welding heads in series. The dial carries five dual fixtures and indexes automatically in a

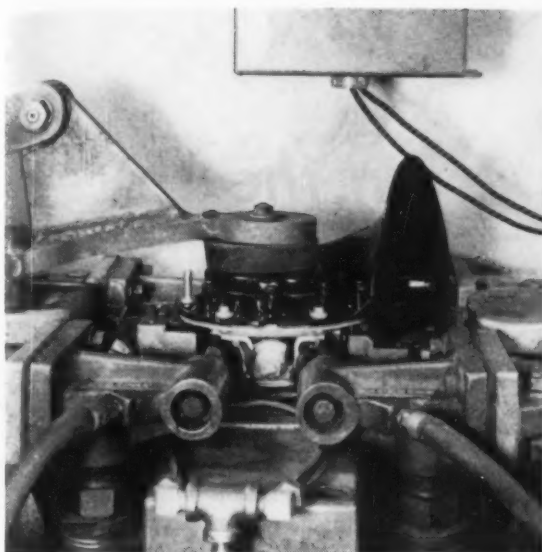


FIG. 5—The base of this horn is welded to four poles in one pass by the equipment's four electrodes, only two of which can be seen here. Two welds are made on each of about 500 horns an hour.

continuous cycle. Two operators each place a pair of stampings over brass pins in the copper fixtures at the two loading stations. However, as the smaller stamping on top of each pair has only one hole, additional means of location are required.

For this reason, two small recesses are coined in the upper face of the larger stamping and the two projections formed in the upper stamping fit these recesses, keeping the smaller piece from possible angular displacement. Actually, the projections automatically bring the two pieces flush as they are pressed together between the electrodes and the welds are made as the projections fuse in the recesses. The latter are filled and the pieces are fastened tightly together and have parallel faces after assembly.

After passing the welding station, the assemblies, still in the fixtures, are carried under a chute at the next station and there are air ejected



FIG. 6—Hardened steel bearings and springs—like those shown on the top electrode—are fastened to the plate being held in position. The operation includes an upsetting step, performed after the bearing's flange is heated in the welder.

upward into the chute and slide into a tote box. With this setup, 1600 complete assemblies per hr are produced.

To provide sufficient cooling, water is fed into each fixture through a water line brought in through a gland at the center of the table. The water feeds through a radial tube and then through looped tubes in series. There is an air connection on each fixture and air is fed momentarily to effect the ejection at the proper station.

It is important to note that these unusual welding jobs are being accomplished in most cases by more or less standard welding machines and welding heads. The addition of automatic or semi-automatic features have expedited every job. These machines are integrated with other production facilities and often occupy one or more stations on a continuous, conveyerized production line.

Liquid blast cleans surfaces in forge shop

REMOVING scale, burrs and discoloration with liquid blasting has reduced die polishing time 10 pct at Rockford Drop Forge Co., Rockford, Ill. The new process has made it possible to hand finish fine details before the metal is finally hardened by heat treatment. The smoother finish that results from liquid blasting also gives better forgings, closer tolerances and reduces the tendency of dies to stick during forging, according to the Rockford concern.

This method of die cleaning and polishing was developed by the Pangborn Corp., Hagerstown, Md. Surfaces are blasted by a stream of aqueous solution in which nonmetallic abrasive particles are suspended. High velocity is imparted by

compressed air. In the twin-cabinet installation at Rockford, a coarser abrasive is used first to remove scale and burrs. A second blasting with finer particles then imparts a high polish.

The abrasive materials are available in particle sizes of 60 to 5000 mesh equivalents. With the finer particles, polishing of metal surfaces may be done without injuring sharp edges, corners or other detailed sections. Precision machined parts may be held within tolerances of 0.0001 in.

Liquid impact blasting is also being used for other types of finishing jobs. Among them are the removal of grinding lines and the lengthening of the useful life of dies used for glass, rubber, plastics and other materials.

AIME

concentrates on the strategic materials

THE men responsible for the mining, melting and production of this country's critical materials met February 19 through 22 in St. Louis. The 171st general meeting of the American Institute of Mining & Metallurgical Engineers featured technical papers and discussions on petroleum, coal, metals and practically all other important industrial minerals. Student prize awards and many medals and honors were bestowed on members for their meritorious contributions to the engineering sciences.

P. M. Tyler, consulting engineer, told the Minerals Economics Div. that Russia, although well stocked with important minerals below ground, lacks the industrial capacity to support a long or large-scale war. He declared Russia's production of minerals is but one-third of those of the U. S. alone, and their chance of matching American production is very slim. On the other side of this fence, S. C. Hollister, of Cornell University's School of Engineering, deplored the lack of trained engineers being produced in this country. Lack of engineering education in the U. S. during World War II will produce a shortage of 40,000 engineers by next year, he declared. Russia, however, trained 150,000 engineers and scientists during the same period.

Metallographer Gives Howe Memorial Lecture

Joseph R. Vilella, research laboratory, U. S. Steel Co., Kearny, N. J., delivered the Howe Memorial Lecture before the Institute of Metals annual meeting. Mr. Vilella reviewed the last 25 years of metallography and probed the future developments. Correct preparation and interpretation of microstructure of steel were discussed by this eminent metallographer. Some of the shortcomings of modern techniques and equipment were explained at this session. The use of ultra-violet light at 3650 angstrom units for magnifications up to 2500 diam was explained and replicas for electron microscopy at 15,000 diam were compared with ordinary micrographs at 2500X made by standard methods. One of the first high magnification micrographs using a water immersion reflecting type objective lens was shown.

The panel discussion on titanium led by Messrs. J. R. Long, U. S. Bureau of Mines, and T. W. Lippert, general manager of Titanium Metals Corp., was preceded by a description of the du Pont furnace for continuous arc melting. S. F. Radtke, Pigments Div., E. I. du Pont de Nemours & Co., presented this paper. Powdered sponge is fed into the copper mold and melted by a revolving carbon arc. The process, conducted under an inert atmosphere, is automatically controlled and can produce 1¼ lb of titanium per hr. The talk was supplemented with a color movie of this experimental furnace in operation.

Titanium Draws Crowd

As usual for the last 2 years, meetings on titanium drew large and attentive audiences in the Institute of Metals Div. Titanium, often called the wonder metal, stayed in character during these symposiums. The group was wondering how they might make low-carbon titanium castings, what carbon and oxygen ranges will prove commercial and what suitable refractory might be developed to hold molten titanium in addition to graphite crucibles or water-cooled copper molds. Outside the pure technical field, the chief wonder left concerning this metal is, "How can we get more of it?" Sponge, made from the magnesium reduction of the tetra-chloride, remains a serious bottleneck to higher production.

The problem of electrode materials was brought out in the discussion. So far, most titanium has been commercially melted under argon atmospheres by carbon or tungsten arcs. It appears to be a toss up of whether high carbon or tungsten is more detrimental to the final product. Neither side is yet too willing to guarantee a specific range for either of these undesirable elements which enter the molten metal via electrode contamination.

Consumable electrodes, made by pressing powdered sponge or just plain sponge, are being considered. Tungsten thoria non-consumable water-cooled electrodes can lick the contamination problem but it was reported that these electrodes can be somewhat disconcerting as they

Continued on Page 134

news of industry

Farm Machinery Makers Slowed by Short Supplies

Crop needs are higher this year . . . But rate at which builders are getting materials may lead to operations of 60 to 65 pct of 1950 . . . Materials not yet assured—By Gene Beaudet.

Chicago—In order to meet the demands of increased agricultural production during 1951 and 1952 farm implement manufacturers would have to produce more this year than they did last. However, they will be unable to do it. The rate at which some farm equipment companies are receiving materials now leads them to estimate that by next June they will be operating at a rate 60 to 65 pct of last year.

So far nothing has been done to assure the farm implement maker of an adequate supply of materials to meet farmers' needs. Even if they were to receive the government's go ahead on materials procurement right now, some officials believe they would not have enough time to produce enough machinery to cover the harvest of 1951 and spring of 1952. The longer they have to wait for adequate supplies the more critical the situation becomes.

Help Not in Sight

With a great volume of defense orders to be placed during the second and third quarters of this year farm implement producers can expect to receive less and less steel. Chances are that they won't receive government assistance until a controlled materials plan is put into effect.

Dealers' inventories throughout

the country are reaching the bottom of the barrel. Shrewd farm buyers, remembering what happened in 1942 and 1943, reversed their usual seasonal buying habits and came into the market last November and December to buy their planting equipment for this spring. As a result dealers' stocks are down.

Missed Their Guess

Just how the industry was forced into such a position isn't too hard to figure out. Last October they came out with a proposal favoring a free market for steel. At that time the Korean war seemed to be waning and the country was expected to continue on a creeping mobilization program. The situation backfired and before anyone realized, it was too late.

The Agriculture Dept., claimant agency for the industry, later made a strong plea for special consideration for farm equipment manufacturers but was turned down. By that time everyone was down in Washington asking for special consideration. The freight car program was in and other programs were being planned. The freight car allocation program became snarled up and NPA, not wishing to risk a similar mixup in farm implements, told them to defer demands. They let the sit-

Turn Page

Small Business Program

Milwaukee, Wis.—Small business was promised access to defense contracts under a plan that will make known to Federal procurement agencies and prime contractors capacity of small plants and form information centers to keep small business posted.

This proposal was made by John C. Pritchard, NPA's Director of the Office of Small Business, at a meeting here last week. He said staffs will be set up in Commerce Dept. and NPA offices to pass on proper procedures and information. Coincidental with the announcement, NPA sent telegrams to all state governors asking formation of commissions to inform Federal agencies of small plant capacities.

Steel Can Meet Armor Plate Needs

Washington — Tonnages of rolled armor plate to be supplied to meet defense requirements for the remainder of 1951 were assigned to the industry last week. Industry spokesmen said they could meet demands.

Nevertheless, the Navy last week was studying plans for reactivating some of its plate mill facilities at South Charleston.

To Build New Refractory Plant

Birmingham—A \$4 million plant will be started here soon by Harbison-Walker Refractories Co. The site has already been purchased near the firm's Fairfield works.

INDUSTRIAL BRIEFS

FAST ACTION — AMERICAN BRASS CO., Waterbury, Conn., really believes in keeping its customers informed. Within 48 hr after amendment No. 2 to copper order M-12 was released the company had reproduced the complete text and had it in the mail on the way to the trade.

PURCHASE — Chicago Safety Equipment Co., Chicago, manufacturer of auxiliary ambulance equipment, has been sold to the KING PNEUMATIC TOOL CO., makers of power lawn mowers. The purchased company will operate as a wholly owned subsidiary.

ROCKET PARTS — Production will start soon on rocket metal components for Army Ordnance, by the AMERICAN STOVE CO., St. Louis. A portion of the firm's St. Louis domestic gas range factory is being converted to accommodate the project. The rocket is regarded as the most effective of all modern anti-tank projectiles.

NEW COMPANY — A new company, PRE-VEST, INC., Cleveland, went into production this week on an investment casting material technically described as "a refractory filler plus bonding ingredients, with the small addition of other chemicals to produce desired physical properties."

MERIT AWARD — In an award presentation at Chicago, executives of CORY CORP., were presented the Merit Award of the American Society of Industrial Engineers. The award was granted to Cory by the society for outstanding work in engineering, research and manufacture.

BACKLOG — Unfilled orders of the DURALOY CO., Scottdale, Pa., high-alloy metal producer, now stand at the highest level in its history, approximately \$2,000,000. This represents an increase of 25% over the backlog of Jan. 1, 1951, and compares with \$450,000 unfilled orders last June.

EXPANSION — Marking their 106th year in the foundry business, BARNETT FOUNDRY & MACHINE CO., Irvington, N. J., have acquired another foundry in Dover, N. J. In recent years the company has steadily expanded its market for Meehanite castings and the new plant will provide extra capacity to meet the increased demands of its customers.

NEW LOCATION — ROTORCRAFT CORP., engaged in military helicopter research and development, has completed moving into new factory headquarters in Glendale, Calif. Experimental projects for the armed services forced the move into quarters providing additional engineering space as well as shop facilities.

PICKLING PLANT — A new pickling plant which will be in operation in early March has been built by the RICH STEEL PICKLING CO., Los Angeles. Adjacent to the Rich Steel Co., the facilities have been designed to pickle steel with greatest efficiency.

HONORARY MEMBER — Dr. William Blum, Chief of the National Bureau of Standards Electrodeposition Section, was honored by the ELECTRODEPOSITORS' TECHNICAL SOCIETY OF LONDON which elected him an honorary member.

SECOND STORY — In order to meet increased production requirements, the INTERNATIONAL RECTIFIER CORP., Los Angeles, has added a second story to its plant. The addition allows increased facilities for the development and manufacture of selenium rectifiers and photocells.

CARRIER ORDER — Interlake Steamship Co., has ordered an 18,000 ton bulk carrier to be built at Sparrows Point, Md., by BETHLEHEM - SPARROWS POINT SHIPYARD, INC. The new vessel is the fifteenth ordered by lake carriers for service on the lakes since Aug. 1.

uation ride until now it is too late to do much about it.

Some may ask why, with the great amount of agricultural implement production since the war, the farmer is in as great or greater need of equipment than he was last year. For one thing the government's requirements for expanding military forces is going to demand a higher percentage of the country's food output. Although there will still be the same number of people, government buying is more wasteful.

Workers Leave Farm

Another reason for greater mechanization is that during the last 10 years 5 million workers have left the farm. That means more equipment to produce more food with less workers. Also the amount of acreage being tilled is less than 10 years ago. Add on to this the fact that the population has increased 20 million in the last 10 years and you can see why more mechanization is needed.

To plant and reap enough farm products to satisfy the military and civilian population during this year and next, farmers will require a tremendous amount of machinery. Since they are for the most part seasonal buyers they will all come in at once. When they do, there won't be enough machinery to go around. And coupled to America's greater requirements is the chore of feeding a needy world.

Ferro-Alloys Plans New Plant

Canton, Ohio — Plans for construction of a new ferro-alloy plant at Brilliant, Ohio, on the Ohio River, have been announced by Ferro-Alloys Corp. The plant is designed for capacity use of 50,000 kw per hr. The plant is expected to be in operation in September of this year.

Midland Plant to Expand

Pittsburgh — To keep pace with growing sales volume, Mackintosh-Hemphill Co. has announced plans to begin expansion at its Midland, Pa., plant soon.

Metallurgists to Guide Research Projects Vital to Defense



DR. R. F. MEHL



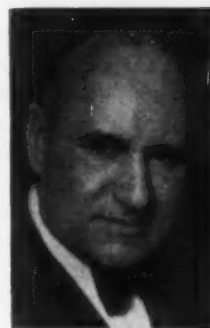
DR. F. JONASSEN



V. H. SCHNEE



W. E. MAHIN



DR. Z. JEFFRIES

Washington — Research advice on metals problems affecting needed arms and armor will be given to the Research Development Board, Dept. of Defense, by the newly-organized Metallurgical Advisory Board. The collection of top metallurgists organized by the National Academy of Sciences—National Research Council will aim at getting the kinks out of metals research problems and thus promote smooth sailing for national defense.

The new board will advise on correlation, coordination, interpretation and application of metals research and development programs conducted or sponsored by the Military. It will suggest new research projects or reorientation of existing research, and collect and distribute useful metallurgical information gathered from professional societies and other sources.

The metallurgists have already started on three currently vital problems: critical and strategic metals and their substitutes; application of metals to high temperatures; and titanium development. They will work on a special project basis.

Listed tentatively for study are critically short columbium, tantalum, cobalt, titanium, molybdenum, tungsten, and beryllium. Other metals will be added.

Dr. Robert F. Mehl, head of the Dept. of Metallurgy, Carnegie Institute of Technology, was named chairman of the board. Dr. Finn Jonassen, of the National Re-

search Council, is executive secretary; V. H. Schnee, vice-president of University of Oklahoma and director of its Research Institute, executive director; William Mahin, Armour Research Foundation director of research, is the board's director of Metallurgical Projects Div.; and Dr. Zay Jeffries heads activities on critical and strategic metals and substitutes.

On the Advisory Board are: Dr. E. C. Bain, assistant vice-president, U. S. Steel Corp.; Dr. John Chipman, of M.I.T.; Dr. Charles H. Herty, Jr., Bethlehem Steel Co.;

Dr. Jeffries, retired from General Electric Co.; Walter E. Jominy, Chrysler Corp.; Dr. A. B. Kinzel, president, Union Carbide & Carbon Research Laboratories, Inc.; Dr. Paul D. Merica, International Nickel Co. of Canada; Dr. Albert J. Phillips, American Smelting & Refining Co.; Leo F. Reinartz, Armco Steel Corp.; Dr. Cyril S. Smith, University of Chicago; Earle C. Smith, Republic Steel Corp.; Dr. Kent R. Van Horn, Aluminum Co. of America, and Dr. Clyde Williams, director, Battelle Memorial Institute.

Baldwin Tank Orders \$60 Million

Philadelphia—New orders for tank hulls received by Baldwin-Lima-Hamilton Corp. have raised the company's order backlog for this equipment to \$60 million, and quadruples the original order of M-46 General Patton tank hulls which are being made for Army Ordnance.

Berger Mfg. Buys New Space

Pittsburgh — Berger Furnace Mfg. Co. has acquired some land and new buildings in Bell Vernon, Pa., for general expansion. The buildings have about 200,000 sq ft of floor space and are located on some 10 acres to which are available both river and rail transport. The company is planning on producing some new types of equipment.

Solar Expanding Two Plants

San Diego, Calif.—Along with an expansion in Solar Aircraft Co.'s plant here, the company will also build a 300,000-sq ft plant on a newly acquired 60-acre site near the Des Moines, Iowa, plant. Solar's capacity in the latter city will be about doubled and the total plant area in both cities will be brought to about 1.1 million sq ft with the completion of the expansion program.

FTC Starts Check on Industry

Washington — The Federal Trade Commission is beginning to check up on industry compliance with government materials controls orders.

FTC is starting its "policing" campaign with spot surveys under National Production Authority ap-

proval to find out how well current regulations are "understood and carried out."

Aluminum fabricators are the first target, FTC said. The results of "spot checks" will serve as the basis for future orders or compliance actions issued by the commission.

An FTC attorney said the commission has information on about 300 alleged violations of government materials-controls orders. Most of these violations, he stated, involved unauthorized use of controlled metals.

GE Jet Plant to Employ 10,000

Schenectady, N. Y.—Manufacturing facilities for aircraft gas turbines will require about 10,000 workers at the General Electric Co. plant at Lockland, O., a 40 pct increase over previous estimates. New buildings will be built at the plant which is being expanded to meet the Air Force's demand for more J-47 turbojets, reported the company.

Europe Faces Ore Shortage

Geneva—Despite a prediction of 3.4 million more tons of available iron ore from ore producing countries in 1953, Europe still faces an ore shortage, according to United Nations experts. Europe expects to produce 15 pct more pig iron in 1953 than it did in 1950.

RUNNING A LINE: Ground for U. S. Steel's new Fairless Works near Morrisville, Pa., was broken Mar. 1. Here surveyors run north-south base line. Cost of plant and tools will be close to \$400 million, and more than 4000 workers will find jobs here.



Scrap Allocations Bail Out Desperate Users

Scrap stocks dwindle, finds AISI committee . . . NPA rescues users with over 100 scrap allocations . . . Scrap must be kept moving to furnaces . . . More scrap will be needed.

New York—Iron and steel scrap inventories are shrinking at an alarming rate. During the past 3 weeks the National Production Authority has rescued hard-pressed consumers with more than 100 allocations of scrap which they could not get through regular market channels.

Scrap Stocks Dwindle

These facts were brought out by Robert W. Wolcott, chairman of Lukens Steel Co. and head of American Iron & Steel Institute's scrap committee, at a press conference here last week. Mr. Wolcott stressed the gravity of the scrap supply situation and urged industry and government to take every possible step to keep scrap moving to hungry steel furnaces. He warned that failure to do so would hamper the rearmament effort and bring a repetition of 1941 when some openhearth furnaces were shut down for lack of steel scrap.

Mr. Wolcott said Bureau of Mines figures would show a decline of about 450,000 tons in scrap consumers' inventories be-

tween Sept. 30, 1950, and Jan. 1, 1951. Consumers' inventories are down to an average of 30 to 35 days, while normal inventories are regarded as about 60-days' supply.

Actually, some consumers are in dire straits now, as evidenced by the more than 100 allocations that NPA has already made. For allocation purposes, NPA has compiled a list of manufacturers who generate more than 100 tons of scrap per month. Urgent need must be proven before NPA will allocate.

"Open Up More Sources"

Mr. Wolcott pointed out that the steel industry's expansion by the end of next year would require from 5 to 7 million tons more scrap than was consumed in 1950, an alltime record year. This is assuming that pig iron expansion matches steel. If the normal scrap cycle is ruptured by shipment of large amounts of material abroad, the potential scrap deficit could be much larger.

"We have some sources that are not being worked on as aggressively as they should be," he declared. He suggested that the government release a maximum of ten obsolete or damaged ships per month from its mothball fleet. These would yield 15,000 to 25,000 tons of good scrap.

He also said there is government scrap in the hands of the Army, Navy and Air Corps. The government should also expedite return of scrap from foreign sources such as South Korea, Germany, and the Pacific islands, he said.

He pointed out that much of the war scrap in the Pacific islands had been sold to private individuals who never moved it. He estimated that there is 500,000 tons of this material that the govern-

ment could repossess and move here to help in the emergency.

He said there were orders and licenses for 300,000 tons of German scrap which was not being brought out. In the first 11 months of last year there were only 650,000 tons of scrap imported from all countries.

Steel companies are checking their shops for old tools and

equipment which are ready to be scrapped, and he urged other industries to do the same. Other potential sources are auto graveyards and worn-out farm equipment.

The Salvage Div. of NPA has organized a tin can collecting and detinning program which could yield 500,000 to 1 million tons of scrap per year, he reported.

Squeeze Hot Billets to Make Propeller Blanks

Hollow steel blanks made in minutes on 5500 ton extrusion press . . . Curtiss-Wright and Air Force puts new method into production . . . Replaces present slow, welded assembly.

New York—White-hot steel billets are being extrusion-squeezed to form 10-ft hollow propeller blanks in a spectacular new production method which will cut hundreds of hours of labor and many costly machining operations from propeller blade production.

Curtiss-Wright Corp., in co-operation with the U. S. Air Force at the Air Force Development Center in Adrian, Mich., developed the method during the past 2 years and now has the hollow steel propeller blanks in pilot production.

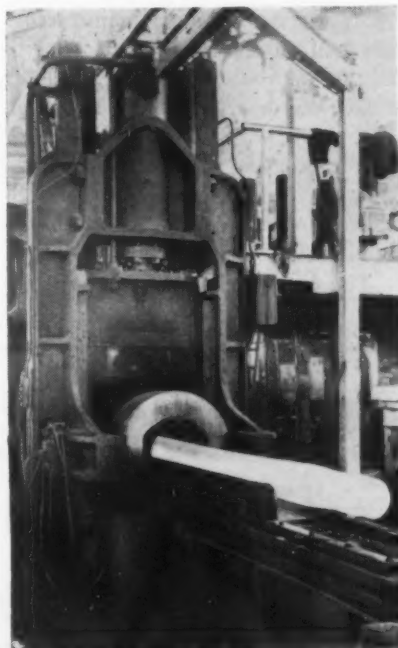
Stronger Blade Possible

Plans are being made to supplement welded propellers now being made with extruded blades as rapidly as facilities become available.

In a series of three steps which can be accomplished in minutes, much tedious hand labor will be eliminated. Savings in vital materials, improvements in blade quality, and a marked increase in strength-weight ratio will be possible. Far fewer tools will be needed, and much manufacturing floor space will be freed.

The tough integral structure of extruded steel adds high resistance to the more severe fatigue and stress factors to which propellers for the new, powerful turbo-prop engines are subjected.

Present propeller blade manufacture is a snail's pace process.



HOT EXTRUSION: Hot steel is squeezed to make propeller blanks in new method developed by Curtiss-Wright and Air Force.

Two specially processed flat plates are welded together, brazed, and formed. Before machining, the blank weighs 700 lbs.

Faced with a potential bottleneck in the quickening pace of aircraft production, the Air Force and Curtiss-Wright sought a means of mass-producing propeller blades to replace the present slow method.

With no previous experience to go by, Curtiss-Wright and Air

Force engineers adapted the hydraulic extrusion process to manufacture of blade blanks of complex shape and tapered thickness.

A chrome-molybdenum-nickel billet weighing 400 lbs was pushed through extrusion dies on a 5500-ton extrusion press to form a 200-lb, 10-ft propeller blade tube.

The rough blade comes from the extrusion press in the form of a tapered-wall, seamless, round tube with ridges running from the shank to the tip.

In a sequence of operations the tube is flattened and shaped, and the ridges form the solid leading and trailing edges of the blade. Finishing operations are similar to those now used. The completed, square-tipped blades are of the same hollow-steel monocoque design as welded blades made by Curtiss-Wright.

Application of the new production method opens further cost and time saving possibilities in the aircraft industry and in other industries.

Aircraft drive shafts, helicopter main rotor blade spars, and landing gear struts can be made in the same manner. Gun barrels, tank and ship parts, and members for prefabricated structures such as bridges and towers can be produced similarly.

Extrusion Die Pool Set Up; Simplifies Supply and Production

Extruders, aircraft companies agree to joint die use . . . Catalog planned.

Dayton—A national aircraft extrusion die pool which will eliminate production bottlenecks and simplify supply, maintenance and production operation has been announced by the Supply Div. of the U. S. Air Force.

The program will standardize extrusion dies and specifications, and prevent duplication. All aircraft manufacturers and extrusion producers are participating in the agreement.

Under the program, a manufacturer relinquishes exclusive rights to his dies. The extrusion pro-

ducer will maintain and replace all dies broken or worn beyond repair as long as there is a foreseeable future requirement.

A die catalog, published for use of all participating groups, will list die and part dimensions, die shapes used by the USAF Navy aircraft, and data such as area, dimensional factors, and index of shapes.

An aircraft manufacturer can quickly tell whether an extrusion of the design he needs is already being made, and where the die can be found. Previously there was no central source for this information and each manufacturer designed dies for his own needs. The catalog will be available about Nov. 1, 1951.

Crucible Reports on Earnings

New York—Net income of \$6,311,254 for 1950 has been reported by Crucible Steel Co. of America. This compares with \$1,352,000 for 1949. Net sales for 1950 were \$147,705,000 against \$99,393,000 for 1949.

NPA Steel Cutbacks Called Window Dressing

Some producers had already cut shipments to auto industry . . . Cut in carbon, alloy bar may slash car production . . . Inventories figure in present output—By John Delaney.

Pittsburgh—The National Production Authority's order cutting back steel for automobiles to 20 pct of shipments during the first half of 1950 was largely "window dressing" in the opinion of some steel producers.

As a matter of fact, shipments to the automobile industry have already been cut back 20 pct—or more—by some producers due to the growth in DO and program tonnage.

At any rate, the car manufacturers will automatically be forced to cut back production as a result of reductions in the tonnage of carbon and alloy bars available to them. The tonnage of other steel products they may be able to obtain through conversion or otherwise would be academic.

The cutback in alloy bars for in-

stance is beginning to bite deep. Total set aside for rated orders in April is 35 pct. This will grow to 60 pct in May. Shipments by one producer to automobile companies in March were cut back 20 pct, and January shipments were off about 10 pct.

Shipments of flat-rolled to the automobile industry were cut back 30 pct by one steel producer in January. Due to the short month, the reduction in shipments during February will amount to 37 pct, but the 30 pct reduction will continue in March.

Automobile producers may be able to live off their inventories for a time, but eventually the shortage of bars will catch up with them. Indications are inventories have been a large factor in maintaining automobile production at present

STEEL PRODUCTION (Ingots and Steel for Castings)

As Reported to the American Iron & Steel Institute

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated Weekly Production (Net Tons)	Number of Weeks in Month
	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity		
† January, 1951	7,838,000	101.3	432,000	90.5	580,000	87.2	8,850,000	99.7	1,993,000	4.43

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,668,267 net tons open hearth, 106,195 net tons Bessemer and 131,786 net tons electric ingots and steel for castings, total 1,906,268 net tons; based on annual capacities as of January 1, 1950 as follows: Open hearth 86,984,490 net tons, Bessemer 5,537,000 net tons, Electric 6,871,310 net tons, total 99,392,800 net tons. Beginning July 1, 1950, the percentages of capacity operated are calculated on weekly capacities of 1,685,059 net tons open hearth, 107,806 net tons Bessemer and 135,856 net tons electric ingots and steel for castings, total 1,928,721 net tons; based on annual capacities as of July 1, 1950 as follows: Open hearth 87,958,990 net tons, Bessemer 5,621,000 net tons, Electric 7,083,510 net tons, total 100,563,500 net tons.

* Revised.

† Preliminary figures, subject to revision.

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated Weekly Production (Net Tons)	Number of Weeks in Month
	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity	Net Tons	Percent of Capacity		
January, 1950	7,131,519	96.5	379,252	80.6	419,601	71.9	7,930,372	93.9	1,790,182	4.43
February	6,142,178	82.0	255,565	60.2	395,502	78.0	6,793,245	89.1	1,698,311	4.00
March	6,747,680	91.3	265,728	65.5	473,630	81.1	7,487,038	88.7	1,690,076	4.43
1st Quarter	20,021,377	93.3	900,543	65.9	1,288,733	76.0	22,210,653	90.6	1,727,111	12.86
April	7,314,733	102.2	407,909	89.5	490,030	88.7	8,212,672	100.4	1,914,378	4.29
May	7,597,837	102.8	437,006	92.9	517,044	88.6	8,551,887	101.3	1,930,449	4.43
June	7,218,570	100.9	408,944	89.3	506,001	89.5	8,131,515	99.4	1,895,458	4.29
2nd Quarter	22,131,140	102.0	1,251,859	90.6	1,513,075	88.2	24,896,074	100.4	1,913,611	13.01
1st 6 months	42,152,517	97.7	2,152,402	78.3	2,801,808	82.2	47,106,727	95.5	1,820,902	25.87
July	7,220,214	96.9	380,317	79.8	470,763	79.4	8,071,294	94.7	1,826,085	4.42
August	7,315,215	98.0	405,118	84.8	509,984	84.7	8,230,317	96.3	1,857,859	4.43
September	7,258,961	100.7	409,216	88.7	525,017	90.3	8,193,194	99.3	1,914,298	4.28
3rd Quarter	21,794,390	98.5	1,194,651	84.4	1,505,764	84.4	24,494,805	96.7	1,865,560	13.13
9 months	63,946,907	98.0	3,347,053	80.4	4,307,572	82.9	71,601,532	95.9	1,835,937	39.00
October	7,731,280	103.6	436,835	91.5	571,980	95.0	8,740,095	102.3	1,972,933	4.43
November	7,108,810	98.3	370,659	80.1	532,382	91.3	8,011,851	96.6	1,867,564	4.29
* December	7,431,388	99.8	380,011	79.8	531,922	88.6	8,343,291	97.9	1,887,622	4.42
* 4th Quarter	22,271,448	100.6	1,187,505	83.8	1,636,284	91.7	25,095,237	99.0	1,909,835	13.14
* 2nd 6 months	44,065,838	99.5	2,382,156	84.1	3,142,048	88.0	49,590,042	97.9	1,887,706	26.27
* Total	86,218,355	98.6	4,534,858	81.3	5,943,856	85.2	96,696,769	96.7	1,834,580	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,746,337 net tons open hearth, 107,806 net tons Bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of January 1, 1951 as follows: Open hearth 91,054,020 net tons, Bessemer 5,621,000 net tons, Electric 7,554,630 net tons, total 104,229,650 net tons.

high levels. Car production will fall sharply in the second quarter.

According to American Iron & Steel Institute, steel shipments to the automobile industry in the first 6 months of 1950 totaled 7,121,051 tons, or 20.6 pct of total shipments. Shipments for the year were 14,-

536,338 tons or 20.5 pct of the total. The industry was still receiving a comparable percentage of total shipments in December, when it received 1,252,770 tons or 19.9 pct of total shipments. Shipments to the car makers in 1949 were 10,962,894 tons or 19.4 pct of the total.

use the new DO-97 rating to obtain MRO supplies without specific NPA approval.

However, a concern that uses the DO-97 (even once) is bound by Reg. 4. This means that MRO purchases must be limited per quarter to 25 pct of 1950 MRO buying (with exceptions for seasonal businesses). Hardship applications may be filed.

This replaces the Jan. 11 amendment to Reg. 2 which permitted defense plants to extend ratings for obtaining dies, tools, etc.

To soften the transition, during the remainder of the first quarter businesses may apply ratings to obtain half the allowable quarterly quota in addition to MRO orders placed prior to Feb. 27.

SAE Interim Steels to Buck Alloy Shortage

Boron-containing series also announced at emergency session of top-ranking metallurgists . . . Interim alloys will be replaced later by the boron group—By Walter Patton.

Detroit—Automobile and steel industry metallurgists have responded quickly to meet the critical alloy situation that has developed as a result of the stepped-up defense program.

An emergency meeting here last week called by iron and steel committee of the Society of Automotive Engineers was attended by 74 top-ranking metallurgists, including representatives of all major steel producers, automobile, truck, tractor, earth moving equipment and aircraft industries. Two important steps were taken to meet the growing alloy shortage:

(1) Two series of interim alloy steels were adopted to replace existing alloy steels for the next 2 or 3 months. These steels, with reduced molybdenum and higher chromium, will be designated as interim series 8600 and 8100 steels. They will temporarily replace existing SAE steels but will not be regarded as standard steels. The price of the interim steels was not announced but is expected to be higher than the grades they are replacing.

(2) Two additional series of alloy steels, designated as 80B00 81B00, containing boron, were announced. The boron series will eventually replace the interim steels announced last week.

At last week's meeting, steel producers said that a number of heats of the new 80B00 and 81B00 have already been made and samples are available to steel consum-

ers on request. Hardenability bands are also available. Consumers will make sample parts during the next few months and test them in service.

It is expected that the new interim steels will begin to replace the 4000 Amola series steels immediately. The 8600 interim steels have .55/.80 CR, .20/.40 NI and .08/.15 MO. The 8100 interim steels contain .30/.60 CR, .20/.40 NI and .08/.25 MO.

Transition to Boron

It was felt that the interim steels will simplify the transition to the new boron-treated steels as well as afford an opportunity for commercial processing experience and field testing.

The Detroit meeting was called at the request of the alloy steel committee of the American Iron and Steel Institute. Porter R. Wray, of U. S. Steel Co., is committee chairman.

NPA Issues MRO Order For Nondefense Use of DO Rating

Washington—For the first time DO ratings may be used for other than strictly defense and supporting programs. National Production Authority has established the MRO (Maintenance, Repair, Operation) program, effective Feb. 27.

Now retail and wholesale stores, service establishments, hospitals, schools and other institutions, and state and local governments may

Aluminum Extrusion Plant To be Reactivated by Kaiser

Oakland, Calif.—A plant to produce aluminum extrusions will be opened by Kaiser Aluminum & Chemical Corp. at Halethorpe, Md., near Baltimore. General Services Administration accepted the Kaiser bid for a 5-year lease with options to renew or purchase the Halethorpe aluminum and magnesium extrusion and forging plant.

Kaiser claims that it can begin production there within 60 to 90 days in view of pressing demand.

Last week, on the heels of announcing a \$78 million expansion program, Kaiser Aluminum paid off \$37,394,250, its total debt, to the U. S. Government. The loan could have run for another 23 years. The firm recently put into production its seventh aluminum pot line at Mead, Wash.

Industry Controls This Week:

NPA Orders:

M-7, Amendment—Stops all production of aluminum window and heating ducts by June 30. Affects residential and non-residential windows. Effective Feb. 21.

M-25, Amendment—Permits packaging of certain food and non-food products with tin. Schedule 11 gives full list. Makes some changes in specifications. Effective Feb. 18.

Serious Freight Car Shortage Faces Shippers

Car building program snafued . . . Lags far behind 10,000 car per month schedule . . . Steel distribution uneven . . . Fasteners, skilled labor bottlenecks . . . NPA takes over from DTA.

New York — Sluggishness of freight car building in getting started has caused National Production Authority to lower its sights to a more realistic goal. Carbuilders ordering full quarterly requirements of steel while others had to cool their heels and a bottleneck in tight metal fasteners overshadows Defense Transportation Administration's vision of 10,000 freight cars a month.

Less Cars than in '50

This situation of plenty in some carbuilders' stocks while others went begging and omission of metal fasteners from the must-have steel list has held car output to about 6000 units in January—affording a scant margin when more than 5000 cars were scrapped.

Add to this the fact that rail-

roads opened the year with 33,000 less cars than they had in January 1950 and the total spells shipping problems. Freight car shipments are already about 20 pct greater now than in 1950 and as the defense program speeds up this percentage will grow to a point where restrictions on non-essential shipping might have to be imposed.

Because of uneven steel distribution among carbuilders, some of them can keep up their share of the load while others cannot even approach it. If the 10,000-car-a-month goal is achieved several months from now, carbuilders must first offset the car deficit from last year and then begin to gain to meet enlarged shipping demands of straining production.

DTA found that some alert builders had quickly read the

small print of their order and had rushed to the suggested steel mills with full quarter orders. Then DTA tried belatedly to right the situation by commanding month-by-month ordering.

The coal and agriculture fields are now complaining to NPA that not enough cars are available. When the Interstate Commerce Commission found that NPA, believing that builders' capacity was not up to the 10,000 car goal, reduced the number to an estimated 7500, ICC beat a path to the Defense Production Administration, pointed out dire possibilities of the shipping shortage, and won, at least, promise of a review of steel allocations.

NPA Shoulders Burden

With DTA deprived of its authority to write orders and requirements because of mistakes it had made, NPA has been trying to unsnarl the situation by meeting with carbuilders. It has extended steel allocations to May 1 instead of a full quarter basis, expecting that builders will get priorities for steel under NPA's planned controlled materials plan.

Defense Contracts to Metalworking Industry

Selected Contracts, Week of Feb. 26, 1951

Items	Quan.	Value	Company
Trailer, 2 Wheel	1,200	1,000,000	Electric Wheel Co., Quincy, Ill.
Machine, mixing	665	343,789	Read Machy Div. Standard Stoker Co., Inc. York, Pa.
Box, locker	200,000	1,759,000	Shwayder Bros., Inc., Denver
Box, locker	100,000	844,000	Texas Trunk Co., San Antonio, Texas
Tanks, fuel	10,000	1,819,200	Engineering Research Corp., Riverdale, Md.
Radios	11,427	2,000,000	Emerson Radio & Phonograph Corp., Phila.
Radio sets	295	1,000,000	Hallicrafters Co., Chicago
Antenna equipment	5,870	1,952,014	J. & H. Smith Mfg. Co., New York
Radio sets	1,747	400,000	Tele King Corp., New York
Radio terminal	500	500,000	Rauland-Borg Co., Chicago
Radio sets	1,746	400,000	The Crosley Corp., Cincinnati
Radio relay set	200	250,000	Rauland-Borg Co., Chicago
Sound locating set	365	1,808,562	Presto Recording Corp., Hackensack, N. J.
Shot, parts assembly	34,200	3,909,744	Carboloy Co., Inc., Detroit
Telephone terminal	1,805	2,800,000	Western Electric Co., New York
Trucks	411	800,000	Highway Trailer Co., Edgerton, Wis.
Radio sets	147	500,000	Barker & Williamson
Electrical equipment	91	1,000,000	General Electric Co., New York
Radio sets	11,451	500,000	Raytheon Mfg. Co., Waltham, Mass.
Radio parts	1,236	1,000,000	ARF Products, River Forest, Ill.
Engine generator	1,420	200,000	John R. Hollingsworth Corp., Clifton Heights, Pa.
Power unit	6,000	3,000,000	O'Keefe & Merritt Co., Los Angeles
Power unit	3,008	1,300,000	D. W. Onan & Sons, Minneapolis
Carrier modulator	1,220	6,505,040	Western Electric Co., New York
Radio equipment	...	8,000,000	Federal Telephone & Radio Corp., Clifton, N. J.
Teletypewriter	988	750,000	Teletype Corp., Chicago
Teletype parts	...	1,000,000	Teletype Corp., Chicago
Radio sets	2,859	2,117,927	Emerson Radio & Phonograph Corp., N. Y.
Signal generator	470	659,500	A. R. F. Products, River Forest, Ill.

Firm's Workers Get \$101,730,000

Youngstown, Ohio — Youngstown Sheet & Tube Co. paid out more than \$101,730,000 to its employees in wages and salaries last year. Another \$9 million went to unemployment compensation, insurance, pensions, and social security.

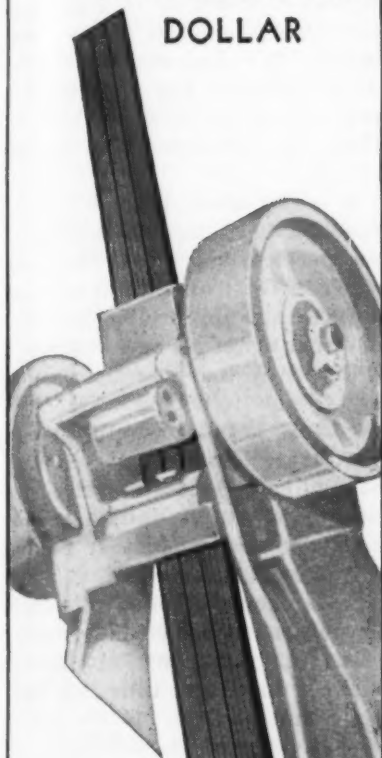
Employees in the Youngstown district received more than \$52 million in wages and salaries, while workers in the Chicago district got nearly \$30 million, and employees in other parts of the country about \$19 million.

To Reline Blast Furnaces

Cleveland—Relining of one of American Steel & Wire Co.'s two blast furnaces here is tentatively scheduled to start Sept. 1, said A. J. Hoyt, Cleveland district manager of Central Furnaces and Docks. The furnace was last relined in 1942.

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**Lake Erie-Ohio River Belt
Engineering Plans Completed**

Freight savings on coal, ore to Ohio
areas seen . . . Wait legal authority.

Akron, Ohio—Expanding steel capacity and the pressing needs of national defense may bring the long-planned 130-mile belt link between the Ohio River and Lake Erie a step closer to reality.

Completion of engineering work on the project, in which more than 24 leading companies took part, has been announced by H. B. Stewart, Jr., president of Akron, Canton and Youngstown R.R., the new Riverlake Belt Conveyor Lines, Inc.

Transportation savings ranging from 50¢ to \$1.50 a ton on coal delivered in Youngstown, Cleveland and Lorain, and savings of 47¢ to 68¢ on iron ore delivered to steel mills in Youngstown and along the Ohio River have been estimated.

Plan 2-Belt System

The belt system, originally projected as a single belt 2-way carrier, will probably have two belts for simultaneous shipment of coal north from the Ohio River, and iron ore south from Lake Erie.

Savings to industry in the eastern Ohio and the Ohio Valley areas have been estimated at from \$20 million to \$45 million annually.

Proponents of the belt link point out that total steel needs would equal the amount needed to build 15,000 open-top railroad freight cars. The \$210 million belt, they say, would do the work of 44,000 freight cars.

Chief obstacle now is enabling legislation to permit belt conveyor transportation companies to do business in the state. Bills have been introduced in both houses of the Ohio legislature.

Rolled Products Opens Warehouse

Detroit—Rolled Products Div. of Michigan Steel Casting Co. has opened a new warehouse here. A complete line of rolled mill forms of high temperature stainless steel alloys will be handled.

News about

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produces glossy
dense black finish**

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**Bright Finishing
is no problem**

Having trouble getting materials for bright finishing? Then consider this: Zinc processed in Unichrome Clear Dip equals more costly and scarcer finishes in appearance. It stretches supplies since it requires only about 1/2 of the plated metal required for usual bright, decorative finishes. It has superior rust resistance. And it's your best bet for economy.

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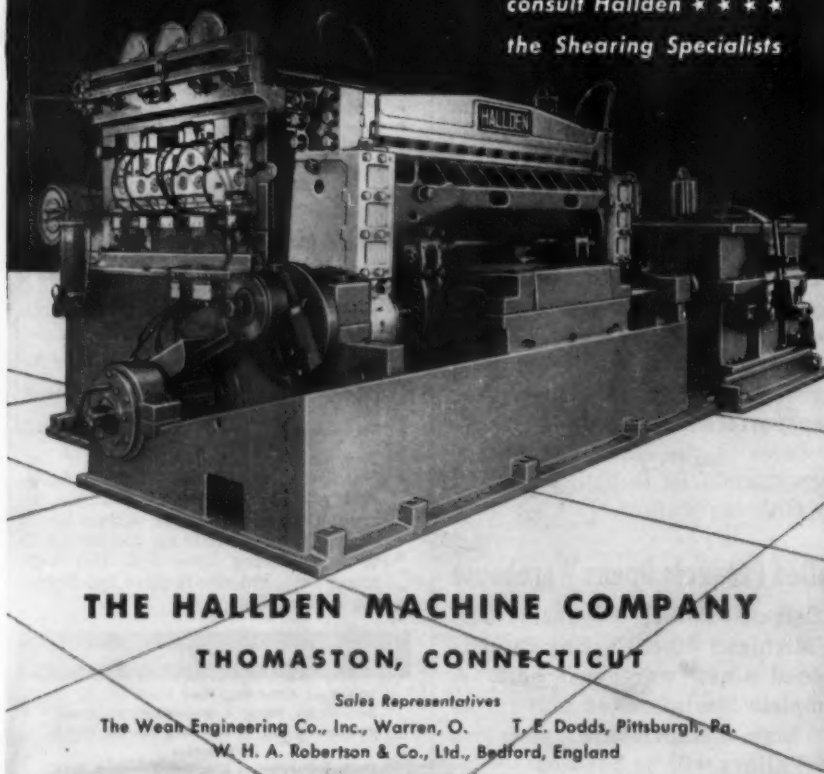
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DPA Sets Aside \$10 Million To Pep Up Prospecting for Metals

Washington — Supporting the Bureau of Mines' drive to increase domestic production of raw materials, the Defense Production Administration has allocated \$10 million for encouraging exploration for strategic and critical metals.

A substantial portion of the funds will be made available to prospectors and small concerns who can carry out such a program without any appreciable diversion of either materials or manpower.

Currently the program will apply to the following: Antimony, asbestos, beryl, bismuth, cerium (and rare earth ores), chrome, cobalt, columbium, copper, cryolite, fluorspar, graphite (crucible flake), kyanite and other mullite refractories, lead, lithium, manganese, mercury, mica (strategic grade), miscellaneous ferroalloy ores, molybdenum, monazite, nickel, tantalum, tungsten, sulphur, and zinc.

U.S. Production Leadership, Survival Hang on Raw Materials

St. Louis—To ensure worldwide production leadership that may mean the difference of survival or defeat under the Red menace, America must make certain of continued and broader access to foreign raw materials, said George W. Wolf, president of U. S. Steel Export Co., before the Metals Branch Council at the recent annual meeting of the American Institute of Mining & Metallurgical Engineers.

He said that America must put its faith on industry to get these vital raw materials, which if denied can lead to conquest by Russia.

Start Unionizing Atomic Work

Oak Ridge, Tenn.—The AFL Atomic Trades and Labor Council has won bargaining rights at the Oak Ridge electro-magnetic atomic plant here—the first union victory since the plant opened in 1943.

Tungsten Distribution Order Planned to Offset Output Cutbacks

Washington—The government is writing a tungsten-control order to provide distribution of the scarce ore among essential users.

The Defense Minerals Administration announced the drafting of the control order after spokesmen for tungsten-consuming industries told the government they faced production cutbacks as high as 60 pct without supply assurances.

At the same time, industry members asked the National Production Authority for more time to fill DO orders because of the time lost in checking and processing imported tungsten ores. They pointed out that ore-to-filament processing sometimes takes as much as 12 months.

The cutting off of Far Eastern sources—which normally account for about 75 pct of world supply—and subsequent price rises by other foreign sellers are complicating current buying problems, the government was told by industry representatives.

Buick Processes Turnings Into Shoveling Chips for Scrap Profits

Detroit—Manufacturers can get extra cash for their scrap by proper sorting, handling, and preparation for shipment. The Buick plant at Flint, Mich., has made it pay exceptionally well.

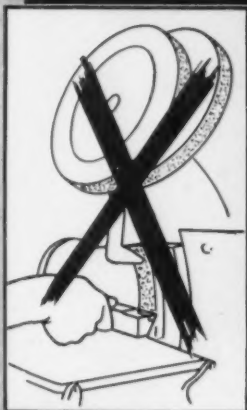
Back in 1928 Buick installed an American Metal Turnings Crusher at this plant to handle the reduction of scrap turnings to shoveling chips. Since then the crusher has handled 9000 tons of turnings per year.

The differential between machine turnings and shoveling chips in the Detroit area has been \$2 per gross ton (now \$3). This means at least \$18,000 per year additional gross profit from scrap.

Records of American Pulverizer Co., St. Louis, show that replacement parts ordered for this crusher since 1928 amounted to \$3039. Based on tonnage, replacement parts cost 1½¢ per ton of scrap processed.

How to CONSERVE

Grinding Wheels and Operator Time



Conservation of materials and manpower, always essential, becomes imperative in times of emergency. Marked savings in equipment and labor required for maintenance operations are readily effected by using metal-cutting tools that stay sharp longer. The full significance of this obvious fact is perhaps not fully realized.

Kennametal tools, for example, work more hours per day, spend less time in the grinding room, and thus help sustain machine productivity, make operators more efficient, and reduce inventory. On important jobs they have demonstrated an ability to do up to four times as much machining per unit of carbide consumed.

This superior performance results from a unique coordination of manufacture and an all-inclusive control of properties—from raw materials to finished product.

Kennametal Inc., in its own plant, refines all carbides directly from ores, oxides, and by-products; processes these carbides into Kennametal compositions by means of exclusive methods and patented techniques; and fabricates complete tool and wear-part designs that utilize the distinctively uniform combination of hardness, strength, and wearability inherent in Kennametal. Outstanding among these efficient application developments is the mechanically-held technique, in which we pioneered.

A sure means to prevent waste of man-hours and equipment, therefore, is Kennametal tooling.

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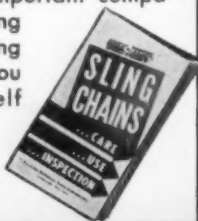
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GE Uses Cadmium Sulfide Crystals for Faster Inspection

May mean high-speed, automatic inspection, finding smaller flaws.

Milwaukee, Wis. — New techniques making possible high-speed, automatic x-ray inspection of industrial products may come from General Electric X-Ray Corp.'s development of processes to produce and use cadmium sulfide crystals, 1000 times more sensitive than electric eye equipment, as x-ray detectors.

Expected benefits include: faster inspection, detection of smaller flaws, use of lower voltage x-ray equipment, simplification of detection systems, and reduction or elimination of protective shielding.

Crystals More Sensitive

Energy is amplified 1 million times by the crystals. On an area for area basis, they are 1 million times more sensitive to x-rays than ionization chambers, and 1000 times more sensitive than photomultiplier tubes of electric eyes. Thus in small sizes they can detect small flaws or small differences in level of material in a container.

They can find flaws or level differences too small for a masked-down phototube to detect with the use of far less x-ray power. Inspection devices using the crystals have been developed for checking the liquid level of canned food and blasting fuses for continuity of powder. Weld inspection and other metal industry applications are now being investigated.

Foot Injury Trips Safety Record

Ellwood City, Pa. — The first lost-time accident in 385 days occurred last week at the Ellwood Works of U. S. Steel's National Tube Co., when an employee suffered a foot injury.

Since the last previous lost-time accident on Jan. 29, 1950, the 3300 employees of the plant had worked 6,743,644 man-hr safely to establish by well over 1 million man-hr the best safety record in the history of the American Steel industry.

STEEL CONSTRUCTION NEWS

New York—January bookings of fabricated structural steel, as reported to the American Institute of Steel Construction, totaled 285,087 tons, an increase of 35% over the monthly average for 1950. For the period June to December of last year bookings were at the annual rate of three million tons while January figure is the highest monthly reported since December, 1929.

Shipments for January totaled 171,886 tons, and while slightly lower than December, were 7% greater than the average for the year 1950.

The backlog (tonnage available for future fabrication) for the next four months only amounts to 787,716 tons, and beyond that period another 1,349,149 tons of work stands on the industry's books, or a potential volume of work ahead of 2,136,865 tons.

Reinforcing bar awards this week included the following:

1000 Tons, Lakewood, Ohio, Edgewater Drive Apt. to Builder Structural Steel Co.

700 Tons, Lexington, Ky., Hotel to Pol-lack Steel Co.

250 Tons, Detroit, U. S. Rubber Co. warehouse to U. S. Steel Supply Co.

220 Tons, Chicago, Terminal Bldg. O'Hare Airport to Truscon Steel Co.

120 Tons, Moline, Ill., Powerplant Iowa Illinois Gas and Electric Co. to Joseph T. Ryerson and Son.

105 Tons, Cuyahoga County, Ohio, highway project No 522.

Reinforcing bar inquiries this week included the following:

305 Tons, Lincoln, Nebr., Joists Elgin Watch Co.

270 Tons, Chicago, Staff apt bldg 809 S. Marshall Ave., University of Illinois.

150 Tons, Akron, Ohio, highway project No 9 Summit County.

140 Tons, Chicago, residence hall for men, 810 S. Walcott St., University of Illinois.

Rheem to Build at Linden, N. J.

New York — Rheemcote litho-graphed and lined steel drums will be shipped into this area from a projected \$1,500,000 plant to be built by Rheem Mfg. Co. on a 30-acre site at Linden, N. J. To start construction soon, Rheem will sell its nearby Bayonne plant and shift its operations to Linden. Production is expected to start in the first quarter of 1952.

Thumbs Down on Wage Rise Offer

New York—A thumbs-down vote of 1650 to 9 was turned in by Bethlehem's Steel's Staten Island, N. Y., workers on the company-offered wage rise of 18½¢ to 23¢ an hr, said local CIO officials. The offer covers 17,000 men in Bethlehem's eight eastern shipyards. The union had previously requested a 43¢ an hr boost.



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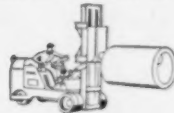


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Tonnage tripled, storage capacity doubled in warehouses and terminals with ceiling-high stacking and swift freight handling the Towmotor MH* way.



MH* FOR EVERY INDUSTRY

Large or small, every plant cuts handling costs with Towmotor MH* . . . proved on the job in more than 10,000 leading plants. Send coupon for more cost-cutting facts!



*MH IS MASS HANDLING . . . systematic movement of the most units in the shortest time, at the lowest cost.

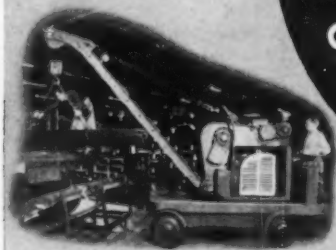
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Please send me a copy of "Handling Materials Illustrated," showing how Towmotor Mass Handling reduces production costs in leading industries.

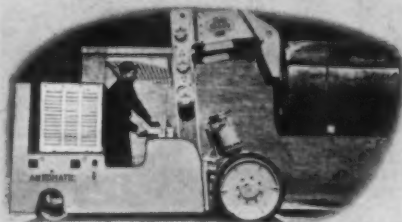
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INDUSTRY'S BUSIEST ELECTRIC TRUCKS are equipped with

Visit The Ready-Power display at the 4th National Materials Handling Exposition, April 30-May 4, International Amphitheatre, Chicago, Booths 427-428.



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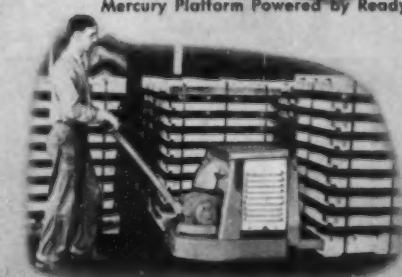
This Automatic Skylift Giant is Ready-Power Equipped



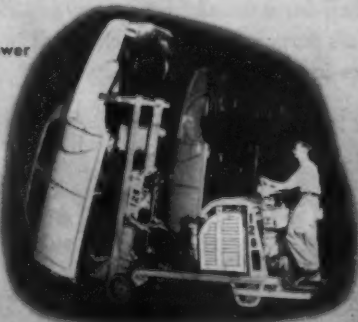
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Where electric trucks must be on the go 24 hours a day . . . where full loads must be carried without interruption . . . Ready-Power meets every qualification.

Always dependable, always economical, Ready-Power Units generate constant power right on the truck chassis. Models for all sizes, types and makes of electric trucks.

The READY-POWER Co.

3822 Grand River Ave., Detroit 8, Michigan

AIME Report

Continued from Page 118

are brittle and subject to breakage. Mr. Radtke and his colleagues, R. M. Schriver and J. A. Snyder, believe that multiple arc melting to produce larger ingots or continuously cast slabs are feasible, if all the electrodes will simultaneously stay lit.

Carbon Content Declassified

The carbon question early in the meeting was declared classified. The symposium, however, fast established a record for declassification by fully plunging into this matter 30 min later. Carbon contents over 0.20 were declared unsuitable because of the deleterious effect on ductility and impact properties. In castings, however, it was thought a somewhat higher carbon content might not be detrimental. This brought up the question by one of the research institutes on how they could make castings in the first place. They complicated it further by specifying low carbon castings weighing 10 to 40 lb. After some imagineering by experts present, it was suggested by a panel member that they use forgings instead of castings.

This very practical recommendation was of no comfort to this member, however, who reiterated that the contract plainly read castings. High carbon titanium castings have proved entirely unmachinable by one of the armed services and they allegedly have a fine display of broken tools, both high-speed and carbide, to back up their sentiments.

Earlier in this meeting, I. E. Campbell, Battelle Memorial Institute, delivered a paper, "Factors Influencing the Purity and Rate of Deposition of Iodide Titanium." Although iodide titanium is not used in commercial production of the metal, the high purity of iodide titanium is attractive for research purposes. One of the factors discussed during and after this paper concerned the exact oxide produced by the iodide process. Temperatures and pressures in the cell govern these reactions to a large extent, it was reported.

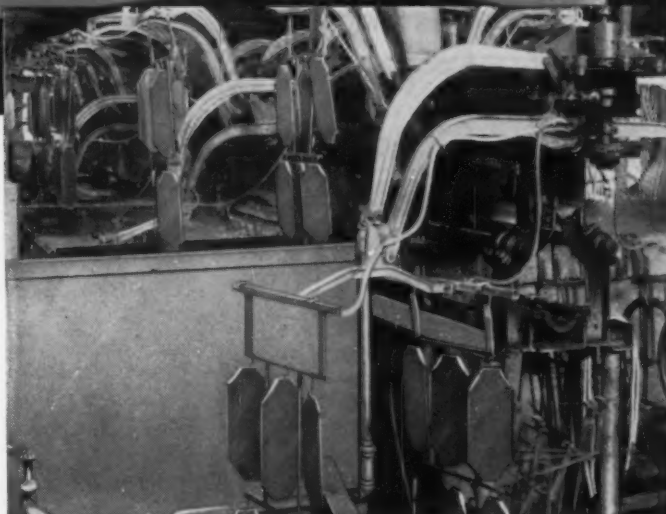
Resume Your Reading on Page 119

Stevens AUTOMATIC MACHINES SOLVE PLATING PROBLEMS FOR THE MAYTAG COMPANY

The use of Stevens Automatic Barrel and Automatic Plating equipment for plating washing machine parts at The Maytag Company plant in Newton, Iowa, has improved plating quality about 70%, according to T. H. Upton, superintendent of metal treating.

"Our Stevens machines require little maintenance and give a substantial saving in man hours at Maytag Plant No. 1, where all parts are plated. Stevens Plating Machines are tops in operation and the results we get from them are very successful. Our plating is more uniform and the controls are accurate. They have to be when we hold our plating tolerance to .0002," reports Mr. Upton.

Maytag's experience with Stevens equipment is typical of many other manufacturers who must combine "eye-appeal" with durable, lifelong performance. Stevens plating equipment is designed—from the ground up—to give better metal finishing results at lower per-unit cost. Let your Stevens representative give you the complete story of Stevens plating machines. Call him today or write direct to Frederic B. Stevens, Inc., Detroit 16, Michigan, for full details.



About 6000 larger parts are zinc-plated daily on this Stevens Automatic Plating Machine with 19 different parts being processed. Just one man operates this zinc-plating machine.



More than 400,000 parts are run through this Stevens Automatic Barrel Plating Machine daily with 328 different parts being plated. This machine also requires but one operator.

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883



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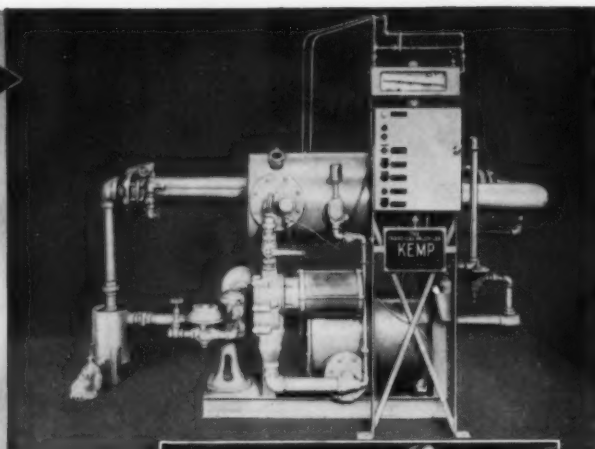
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Model 1 MIHE offers
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delivers
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...is fully
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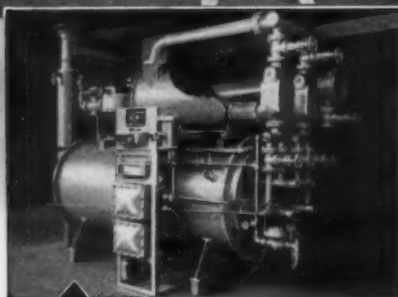
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**Kemp Inert Gas Generators
Save \$9 of the \$10 you now
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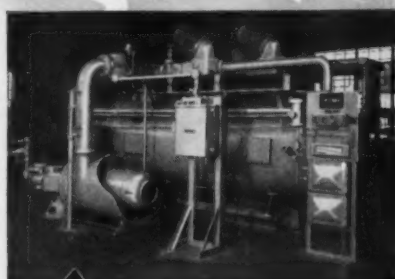
Need inerts for purging, fire protection, mixing, blanketing or a special application? You can save up to 90% on Inert Gas costs when you generate your own inerts with a Kemp Inert Gas Producer. The cost of transportation, bottle juggling, storage, deposits on cylinder inventories and the initial higher cost of bottled nitrogen or CO₂ is eliminated.

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No matter what the demand, Kemp Inert Gas Generators give you the same analysis Inert Gas from 20% to 100% of capacity. The Kemp Industrial Carburetor, part of each installation, burns ordinary gas just as it comes from the mains. Assures complete com-



Model 6 MIHE is ideal for agitating, bubbling and blanketing in synthetic resin plants . . . delivers 6000 cfh.



Model 60 MIHE produces 60,000 cfh . . . is widely used for purging and blanketing in the petroleum industry.

bustion without "tinkering." Produces a clean, chemically inert gas to meet your most exacting requirements.

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• News of Industry •

Continental Gets Orders For New Standard Tank Engines

Detroit—If standardization ever gets the attention it deserves, Continental Motors will get high praise for its development of a standardized design of air-cooled engines for Army Ordnance.

Continental first announced completion of its standardization project in September 1948. Its new line of engines comprises six models, ranging from 125 to 1040 hp. Four are horizontally-opposed engines. Two are V-type engines. Only two basic cylinders—4 $\frac{5}{8}$ and 5 $\frac{3}{4}$ in. diam—are used. All high-mortality parts are interchangeable. Other features include low weight and small size in relation to power output.

Continental got its first tank order November 1948. Shipment started in 1949. These engines now power the Gen. Patton tanks being used in Korea. Additional orders are being received by Continental, "Not only for the 12 cylinder model but also for a second model to power another tank."

Foundry Asks Casting's End Use

Hamilton, Ohio—Tightened supplies of foundry materials and the possibility of further government restrictions are the basis for a request by Hamilton Foundry & Machine Co. to all customers on end use of castings.

Hamilton, with large amounts of DO priority rated work, is unable to replenish material and supply usages. Information is requested on the casting's use as a component part, and as part of a sub-assembly, end product or end item.

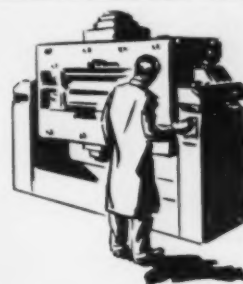
Walsh Ups Refractory Output

St. Louis—The Vandalia, Mo., plant of Walsh Refractories Corp. is having its annual capacity lifted by an additional 1000 carloads of fire brick and other refractory materials. A National Security Resources Board certificate of necessity has been obtained for the project which should be completed by this summer.

speed... with 22,000,000 volts

**you can radiograph an
8" steel section like this with
1 exposure in
2 minutes flat**

Single exposure betatron radiograph of steel gate-valve assembly. Exposure 2 minutes. Small scale reproduction suffers loss of fine detail



Allis-Chalmers Betatron, stationary model. We are prepared to provide several types of mounting, including travelling crane.

**BETATRON
speed**

22 million volt x-rays will penetrate 20 inches of steel in 10 minutes.

**BETATRON
detail**

Focal spot is so small (.00005 sq. in.) that you get pin-point detail.

**BETATRON
ease**

No need for barium or lead-blocking agents to prevent "burning out" of thin sections.

**BETATRON
economy**

Fewer, faster radiographs means savings in man-hours, plant-hours, films.

The Allis-Chalmers Betatron makes short work of heavy-duty industrial radiography. With *one exposure* you can x-ray complex castings and forgings or even entire assemblies (such as motors) and do it directly without time-consuming "blocking" preliminaries. Detail is so fine that flaws as small as 1/32" deep, or .002" wide can be detected in steel from 2 to 12 inches thick. Latitude is so great that fewer radiographs are needed. Let us send you exposure charts to show you how the betatron can speed up your x-ray inspections.

**ALLIS-CHALMERS
Betatron**

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PLEASE SEND ME betatron literature and exposure charts.

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Steel Hijackers Nabbed On Tip from Suspicious Watchman

Cleveland — Police and FBI agents have jailed four Cleveland men as suspects in an interstate theft ring which hijacked Cleveland-Detroit shipments of sheets.

Master mind of the ring is thought to be a 29-year-old university graduate who offered \$3000 worth of steel to a local steel warehouse even before the load was hijacked.

The 47,000 lb load was shipped by Republic Steel Corp. to General Steel Co., Detroit. When traffic was halted by sleet-covered roads, the driver disengaged his tractor and drove home, leaving the double trailer load of steel.

Police said a member of the theft ring who owned a tractor hauled the steel to a local steel supply firm, where the night watchman became suspicious and reported the tractor's license number to his employers, who notified police.

FBI agents entered the case because theft of interstate motor shipments is a Federal offense.

Freight Car Backlog Hits Record

Washington—With the 26,356 new domestic freight cars ordered in January, the number of cars on order as of Feb. 1 reached 144,758, a record, reported the American Railway Car Institute and the Assn. of American Railroads. January delivery of new cars was 5949, a slight increase over December's 5700.

Carbuilders are expected to reach the 10,000 per month level by April or May now that NPA is allocating 10,000 car-sets of steel to the industry, the agencies said.

Plan Standardization Seminar

New York—Dr. John Gaillard will hold the next seminar on organization and operation of company standardization work at the Engineering Societies Building, June 18 to 22. Registration may be made by writing Dr. Gaillard, 400 West 118th St., New York 27, N. Y.



Unusually clean sockets in double-extrusion-produced Cleveland Socket Screws

You're sure of faster-working, extra clean sockets in Cleveland Socket Head Screws. Made by the Kaufman Double Extrusion Process in closely controlled progressive operations in one machine, (see above) sockets are perfectly concentric, true hex with sharp corners, and clean—all the way to the bottom. It pays you to specify and buy Cleveland Socket Head Screws.

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2917 East 79th Street Cleveland 4, Ohio
Warehouses: Chicago, Philadelphia, New York, Providence

CLEVELAND *Top Quality* **FASTENERS**





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Radioisotopes Featured In New Films by Army Signal Corps

Washington—A series of training films on the use of radioisotopes is being prepared by the Army Signal Corps for the Armed Forces Institute of Pathology, with technical assistance from the Atomic Energy Commission.

The films are aimed for medical, scientific, engineering and technical personnel who plan to use radioisotopes in medical and research programs in the armed forces, but will also be available to qualified civilian educational and scientific groups. Fourteen films will be produced.

Reliance Sales Near \$7 Million

Cleveland—Net earnings of Reliance Electric & Engineering Co. for the first quarter ended Jan. 31, 1951, after taxes and depreciation, but including \$88,205 of non-recurring income, totaled \$417,800 on gross sales of \$6,934,485, it was announced here. Net is equivalent to \$1 per share on the 418,442 shares outstanding since the recent two-for-one split of the company's old common stock.

Backlog, which was \$16,000,000 on Dec. 31, is now about \$18,000,000, and continuing to increase, the report stated.

Bendix Reports 1950 Earnings

New York—Bendix Aviation Corp. has increased employment by 40 pct since the start of the Korean war, according to Malcolm P. Ferguson, president. The corporation reported net income of \$16,954,116 for the fiscal year ended Sept. 30, 1950, with aviation equipment comprising 49 pct of total sales volume.

Dravo Awarded Crane Contract

Pittsburgh—A contract for 13 floating cranes, seven of them of 100-ton capacity, and six of 60-ton capacity, was received by Dravo Corp. from the Dept. of the Navy, Bureau of Yards and Docks. Two of the 100-tonners will be shipped to the West Coast, the others assigned to Atlantic ports.



Now is the time for every possible advantage in operating procedures, tools and equipment. Time-saving is urgent. Precision is imperative. Waste-elimination is vital.

Electro's NEW CUTRITE CUT-OFF WHEELS already have set such new records as . . .

9500 cuts on $\frac{1}{4}$ " alloy valve stock; outlived and outperformed competitive wheels on $15/32$ " carbon steel, drill bit rod; cut $2" \times 1\frac{3}{4}"$ risers on nickel-iron castings in 16 seconds; gave 46.6% longer service than the average of competitive wheels on a numerous miscellany of 1" stock; and defied severe binding-breakage tests.

Write, wire or phone for a competent Field Engineer to prove these new wheels on your jobs. Also, if you need it, to help with problems of rough grinding like snagging and precision work like roll grinding.

HIGH-SPEED GRINDING WHEELS • CRUCIBLES • REFRACTORIES • SIC Electro-Carb BRIQUETS • STOPPER HEADS-POROUS MEDIA • Electro-Carb (SIC) ABRASIVE GRAIN, GRITS



West Coast Warehouse . . . Los Angeles • Canadian Electric Furnace Plant, P. Q.

**Udylite Full Automatic Plating Machine
Has Had Only Fifteen Hours
Down Time in Five Years**



Udylite Full Automatic Plating Machine at
Coggins Manufacturing Company, Meriden, Conn.

How's *that* for a record of rugged dependability? In operation anywhere from eight to ten hours a day . . . day in and day out, this Udylite Full Automatic Plating Machine thrives on hard work. And this record is no accident. Udylite Plating Machines are designed for stamina and long-lived operation.

Udylite machines are built from the ground up as self-integrated units to withstand stress and strain. Base, superstructure, tanks and controls are built for each other and factory-assembled to eliminate mis-matching and installation headaches. Udylite machines are

supported *on their own* bases. There's no need for special foundations or shoring. And Udylite's simplified design with hydraulic lift and pusher assemblies make operation and maintenance a simple task.

Let your nearby Udylite Technical Man give you *all* the facts about Udylite Plating Machines today. There's no obligation. Just give him a 'phone call or write direct to *The Udylite Corporation, Detroit 11, Michigan.*

PIONEER OF A BETTER WAY IN PLATING

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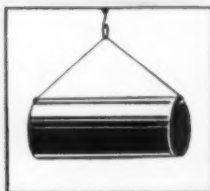
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Now any load can be lifted the easiest way it can be picked up. And perfect balance is maintained every time.

Sling hooks are attached to load, saddle moved to correct position along chain's links which fit in pockets of the ACCO SLING CHAIN ADJUSTER. Then load is ready for lifting. Twisting or spiking of chain is unnecessary. Made in sizes for 1/2", 3/8", 3/4", and 7/8" chain.



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"Intentionally Better"
**SLING
CHAINS**

Plan New Birmingham Plants; To Make Vermiculite and Fittings

Birmingham—Two new manufacturing plants were announced for Birmingham recently. One is the Southern Zonolite Co., which will manufacture vermiculite, a porous building material. The other is the Betha Co., Inc., which will manufacture aluminum electrical fittings for transmission lines.

The Zonolite Co. will bring vermiculite ore here from mines at Travelers Rest, S. C. Conveyors will feed the ore into the rotary kiln. The ore, a form of mica, will explode into material which will be used as insulation, in plaster and concrete products.

Start Alabama Light Bulb Plant

Reform, Ala. — Ground was broken here recently for a new \$3 million electric light bulb plant for Westinghouse Electric Co. Otis O. Rae, district manager, said the plant will provide 150,000 sq ft of floor space and employ from 400 to 600 workers, most of whom will be women.

This will be the tenth plant of the Westinghouse Lamp Div. and the first consumer goods plant of the company to locate in Alabama. The company also will build a plant in Birmingham to manufacture and repair large electrical equipment.



-ALI-



Molybdenum



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As in World War II, the needs of our Government for defense are so large as to require a control over the uses of Molybdenum. Molybdenum distribution and inventory have been put under control by the National Production Authority, thus directing the available supply into proper channels.

In this rapidly expanding alloy age, a shortage of all alloying elements can be expected during the present crisis.

The Climax Molybdenum Company pledges to continue its labors to increase the availability of Molybdenum at as rapid a pace as possible. In the meantime, our technical staff is at your service to discuss ways of conserving Molybdenum.

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500 Fifth Avenue · New York City

For repetitive cutting . . .

**THIS COMBINATION SAVES
TIME AND MONEY**

Wells No. 12 Metal Cutting Band Saw and Wells-O-Bar Feed Master

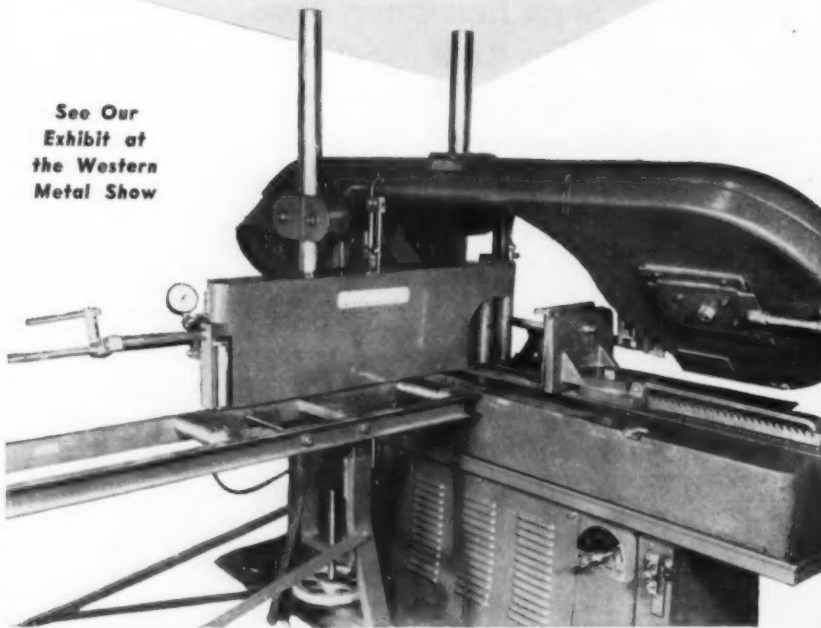
ANY quantity of identical lengths of bar stock are cut automatically in a Wells No. 12 Heavy Duty Metal Cutting Band Saw equipped with a Wells-O-Bar Feed Master.

In operation, the cutting head of the saw descends at a rate governed by a predetermined blade pressure setting. At the completion of each cut, the head automatically rises to a preset height and the stock is automatically projected for the next cut. The machine requires no attention except for reloading. The saw is powered by two electric motors ($3/4$ and $1/3$ H.P.); the feed requires air at 60 to 80 psi. Capacity of the saw is $12\frac{3}{4}$ " O.D. for rounds, 12" x 16" rectangular; standard feed will project up to 17".

The feed mechanism does not interfere with the use of the saw for making single cuts. Saw and feed can be purchased separately or as a combination. The feed unit can easily be attached to horizontal band saws now in service.

Ask your Wells Dealer for complete information or write direct.

See Our
Exhibit at
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BAND SAWS**

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• News of Industry •

Schuman Plan Countries Enter Merger Plan Policy Debate Stage

Will be battle of conflicting politics, economies . . . Seek advantage.

Dusseldorf—The seven Schuman Plan countries after 7 months' hard work have tied all the strings on technical details for the coal-steel resources merger and are now in the round table stage of wrangling out policy. It will be a battle of conflicting politics and economics.

German politicians and coal and steel industrialists concur in their natural desire to win advantages for the Ruhr. French leaders who had the vision of making every European coal and steel producer equally sound, contend that continued existence of the German coal pool will make the Schuman Plan a travesty. They say the coal pool would favor German steel.

The Belgians insist on production for their inefficient coal mines for another 6 or 7 years as protection.

Fear ECA Mill Competition

Ruhr resistance to French arguments that the vertical structure of German coal and steel industries be knocked apart may be only political pressure from Bonn to lift Allied control of the Ruhr. The Germans also fear competition from ECA-aided European mills. German steel has not been showered with ECA money.

Ruhr industrialists are resentful of the big new plant at Denain, France, the \$200 million Belgian plant at Jemeppe-Sur-Meuse, and the now-under-construction Sollac mill in Lorraine, France. These fast modern mills are enough to make German steel men scramble.

A background of skillful planned pricing by German cartel central bureaus makes Ruhr amenable to Schuman Plan price arrangements. But the Germans counter the French gripe about German coal price differentials favoring German steel by citing French practice of selling at lower prices to the United States and higher to the sterling zone.

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Enter
the Stage

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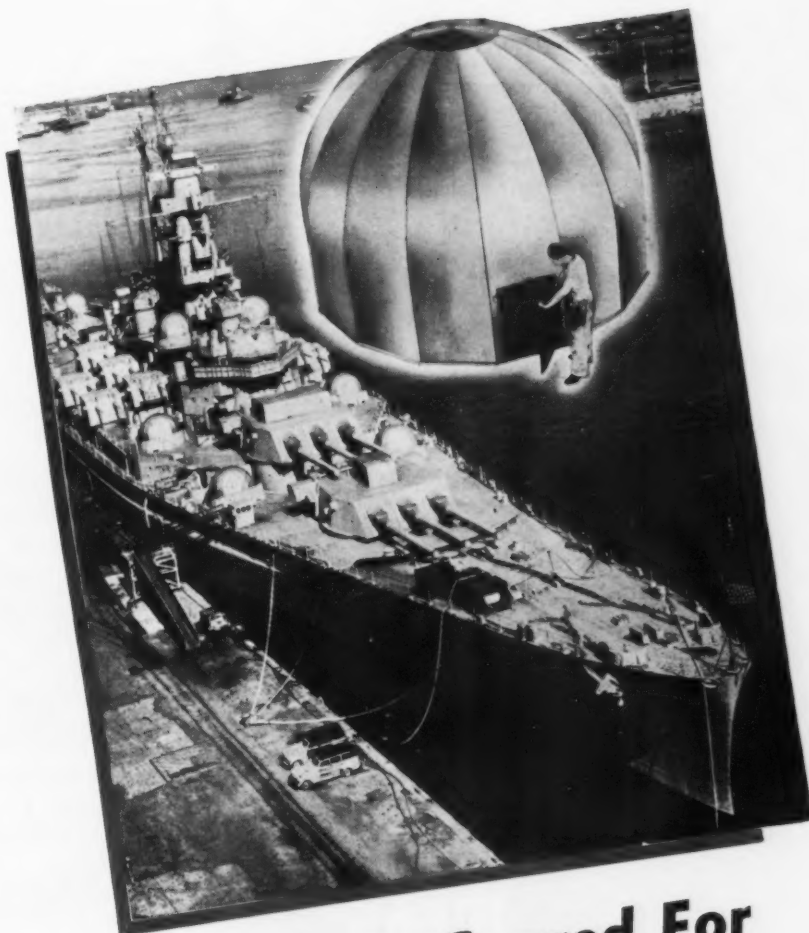
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Brandt Engineers Will Expedite Your Inquiry.

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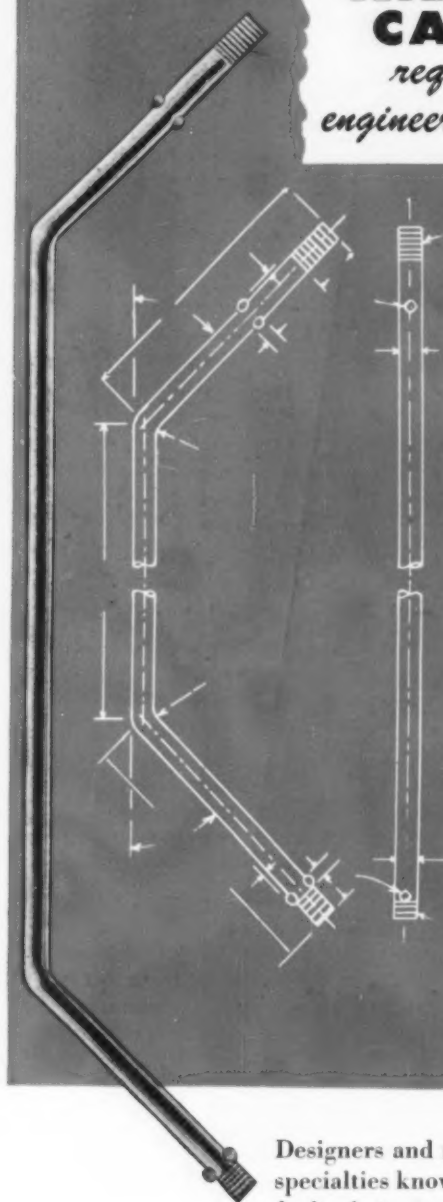
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CARS**
*require
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*For simplicity,
safety and
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**THIS SPECIAL
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FOOT LEVER
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Designers and manufacturers of toys and hardware specialties know that product failure is often due to faulty fasteners. The strength, economy and simplicity of parts like this make their use a "natural." We have the capacity to meet volume demands for related bent rod products, accurately held to close tolerances. Your product will benefit from our "know-how."

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Our Specialty is "SOMETHING SPECIAL"

Magnetic Metals Co. Expands Its Magnetic Core Parts Capacity

Camden, N. J.—Expansion now underway at Magnetic Metals Co. will permit production of magnetic core parts for communications and electronic equipment at more than six times the pre-Korean rate. The company explained the expansion was needed to keep pace with growing defense demand for its products.

The building program, already under way, means the erection of a new front and rear structure to the company's present factory here. When completed, the firm will gain 15,000 sq ft of floor space in which it will be able to produce vital defense goods. The company expects the extra space will permit the handling of 15 per cent more military production than the plant processed during World War II.

These production gains are foreseen as a result of a straight line production operation, better handling of materials for shipping and receiving, and increased warehousing areas for critical raw materials.

The new construction permits the company to shift emphasis from its output normally used in radios, television sets, sewing machines, etc., to production of precision nickel alloy core material for military requirements. Employment will be raised from 190 to nearly 300.

Takes on Mack Line in West

New York—Under the terms of a recent agreement, Wooldridge Mfg. Co., Sunnyvale, Calif., will partly manufacture and fully assemble off-highway vehicles of the Mack Mfg. Corp. These vehicles are designed for use in rough country by mining, logging and heavy contracting companies in the West.

The Sunnyvale plant will be expanded to the tune of about \$250,000 and the payroll will be bolstered by an additional \$1 million. Wooldridge will also act as exclusive distributor for Mack off-highway equipment in the West.




This Elwell-Parker with a 144" low-lift platform loads and unloads autoclaves.

**Upkeep Cost Only
\$3.³⁶ per Truck-Month!**

Two Elwell-Parkers prove their dependability during 5 years of combined service on extra-rugged work

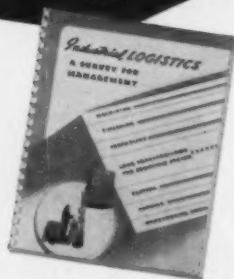
Extra-rugged is truly the word for the jobs done by the E-P trucks on this installation. For example, one of the Elwell-Parkers has carried an average of 660 tons in 24 hours—six days a week for over 28 months! The other truck has already seen 35 months of service. During the total of 63 truck-months, the amount spent for parts and tires was \$211.64. Thus the upkeep cost averaged a remarkably low \$3.36 per month. Exclusive of tires, the amount was only 85¢ per month.

"We are pleased indeed with this equipment," reports the plant manager. The recent order of a third Elwell-Parker is further evidence of customer satisfaction.

Dependable Elwell-Parkers can cut your handling costs too, by giving years and years of steady service at minimum maintenance. Ask your near-by  man for a specific recommendation. The Elwell-Parker Electric Company, 4071 St. Clair Ave., Cleveland 3, Ohio.

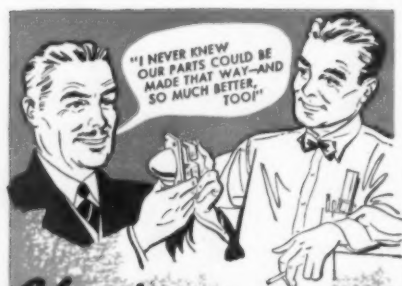
FREE BOOKLET

fully explains
scientific materials
handling. Ask for
"Industrial Logistics".



ELWELL-PARKER
POWER INDUSTRIAL TRUCKS

Established 1893



**Yes, Theoll "COLD-HEADING"
AND ROLL THREADING PROCESSES
MAKE BETTER PARTS...**



Countless small parts usually made by conventional turning processes — by stamping, drawing, casting or molding — can be made *better... stronger... cheaper* by cold-heading and roll threading.

Machining of Cold-Headed Parts is hardly ever necessary because shank and head dimensions can be held to very close tolerances. Rolled threads are produced to American Standard dimensions.

Here are just a few of the many parts formed or roll threaded...

Screws	Plastic Inserts	Stems
Bolts	Thumb Screws	Arms
Studs	Wing Nuts	Plugs
Rivets	Small Gears	Prongs
Rods	Tongue—Clevis	Points
Links	Segments	Hooks

Single or multiple secondary operations can be performed on cold-headed parts to produce special characteristics required to fit the part for its particular application. These secondary operations include drilling, tapping, milling, shaving, flattening, notching, flanging, trimming, serrating, bending, off-setting, slotting, fluting, swaging, knurling, pointing, heat treating, plating and finishing.

**ARE YOU
MISSING THIS SAVING?**

Write or call in a Theoll engineer. Explain your production problems. He will tell you where you can save money, speed production, improve your product appearance.

Theoll
MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS
Industrial Fasteners and Holding Devices

Allied Products Corp. Buys Mich. Powdered Metal Products

Detroit—Allied Products Corp., Detroit, has acquired all of the outstanding stock of Michigan Powdered Metal Products Co., Inc., Northville, Mich., it has been announced by Ralph Hubbard, Allied's president, and John Haller, MPMP's former president and founder. As a result, the Northville company became a wholly-owned subsidiary of Allied Products Corp.

With the acquisition of facilities for manufacturing powdered metal products, Allied Products Corp. enlarges the scope of its production of metal parts which includes the manufacture of hardened and precision ground parts and cold forged parts.

In its various plants, Allied also produces sheet metal dies, Allite (zinc alloy) precision-cast dies, and R-B interchangeable punches and dies. It is believed that powdered metal will be utilized in the manufacture of some of Allied's present products as well as those planned for the future.

Execs See Low Profits in '51

New York—The first 6 months of 1951 will be less profitable for industry according to a survey of 178 manufacturing executives, conducted by the National Industrial Conference Board.

Higher material and labor costs, more low-profit government orders, smaller margins on civilian business, and a larger tax bite were listed as causes. Vagueness of American defense plans and the uncertainty of world events were also listed.

Vanadium Corp. to Run Mine

New York—United States Vanadium Co., a division of Union Carbide & Carbon Corp., will operate the corporation's mine and mill located at Pine Creek, Bishop, Calif., it has been announced. The plant, one of the largest of the type in the world, is operating at peak capacity. Plans are under way to process ores from properties at Winnemucca, Nev.

**Greater Tonnage
Per Edge of Blade**

**AMERICAN
SHEAR KNIFE CO.**
HOMESTEAD - PENNSYLVANIA

THE ACTUAL IS LIMITED:

THE POSSIBLE IS IMMENSE

NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1951

Machine frame designed in welded steel maintains alignment to .005"



Textile machine bed fabricated at The Warner and Swasey Company, Cleveland, Ohio, shows cast steel adapter welded to end of frame.

BY redesigning to a simpler, more economical welded steel construction, this prominent machine tool and textile equipment builder now maintains closer production tolerances while cutting the machining time from 8 hours to 2 1/4 hours. Alignment accuracy, held within .005" and squareness to within .0015 on the 120 inch frame members shown, is maintained with only one roughing and one finishing cut.

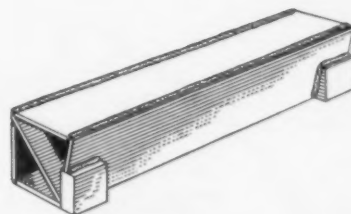
In addition to saving 170 pounds of metal on each frame, welding time has been cut in half and stress relieving eliminated.

Welding engineers at Lincoln will gladly show you how to design your products in welded steel to improve performance and cut your manufacturing costs. Simply write or call.

Originally the frame was fabricated from sheared plate using continuous corner welds. The

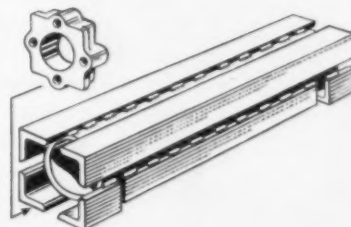
HOW TO DESIGN FOR WELDED STEEL. Latest engineering data, techniques, speeds and costs are presented in the new 9th Edition Procedure Handbook of Arc Welding Design & Practice. Price only \$2.00 postpaid in U. S. A.; \$2.50 elsewhere.

the **ACTUAL**



Original Design of bed frame for textile machine was difficult to machine accurately... required stress relieving.

increasing the **YIELD**



Present Design takes 21% less metal... 50% less welding... eliminates need for stress relieving.

the **IMMENSITY**
of the **POSSIBLE**
A 72% REDUCTION
in machining time

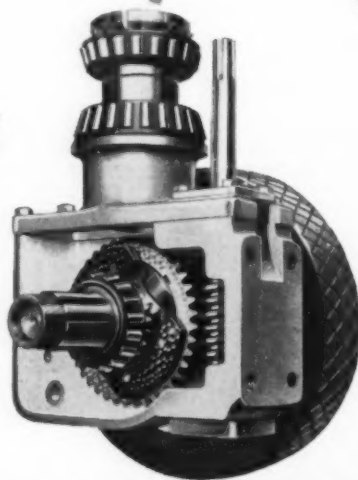
SEE HOW STEEL DESIGN
INCREASES ACCURACY

Machine Design Sheets free on request to designers and engineers. Write on your letterhead to Dept. 53,

THE LINCOLN ELECTRIC COMPANY
CLEVELAND 1, OHIO

Here's why users get "400% longer life"

*from
Stuebing
Hydroelectrics*



This sealed gear drive cuts 80% off maintenance and downtime!

Sealed in lubricant, this alloy-steel gear drive in the Stuebing Hydroelectric takes the place of old-style drive chains . . . actually gives Stuebing walkie trucks a drive comparable to modern automobiles.

Only Stuebing engineered Lift Trucks give you this sealed gear drive plus four-wheel stability, easy steering and twin front driving wheels.

From users came startling reports of increased service life up to "400% and more!" plus astounding savings on repairs and downtime. "No repairs . . . no downtime," reports one user. "No maintenance in a year and a half of heavy service," reports another.

You can have these same startling savings on walkie truck costs in your own plant, in addition, of course, to savings up to 80% on handling costs. Let us show you! Write for Bulletin Y.



1071 STANDARD MODELS AVAILABLE

Lift Trucks Incorporated

2425 Spring Grove Avenue Cincinnati 14, Ohio

• News of Industry •

Canadian Pig Iron Production At Record 2,309,732 Tons in 1950

Toronto — Canadian pig iron production for 1950 set a new all-time high record of 2,309,732 net tons, compared with 2,154,352 tons for 1949 and 2,120,909 tons for 1948. Production included 1,763,440 tons of basic iron, 230,874 tons of foundry iron, and 315,418 tons of malleable iron.

Pig iron output in December, 1950, amounted to 198,169 net tons, a daily average of 85 pct of capacity and compares with 208,301 tons or 92.3 pct for November and 172,002 tons or 73.7 pct for December, 1949. Output for December included 149,387 tons of basic iron, 20,916 tons of foundry iron, and 27,866 tons of malleable iron.

Production of ferro-alloys for 1950 amounted to 181,575 net tons compared with 211,603 tons in 1949 and 250,659 tons in 1948. December, 1950, production of ferro-alloys amounted to 15,341 net tons and included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferro-phosphorus.

Steel Plants Fight Air Pollution

New York—A clean air campaign is being conducted by America's steel companies which "wash" more than 7 million cu ft of blast furnace gas every minute. The washed gas contains less dust than the surrounding atmosphere in some instances, reports the American Iron & Steel Institute.

Among the numerous types of equipment working against air pollution are centrifugal force, water pressure, electrical and sonic equipment and many other devices.

Foundry Equipment Orders Rise

Cleveland — A jump of 366.9 points in the index of new orders for new equipment between January and December of 1950 has been reported by the Foundry Equipment Mfrs. Assn. The December index figure is 526.2.

MicroRold[®] 430

polished sheets now available



During the current critical nickel shortage, the same close tolerance and uniformity of gauge that have made MicroRold 18-8 so outstanding are now being incorporated in MicroRold 430.

It is important that the individual end use be discussed with your distributor or with our metallurgical department.

MicroRold 430 has moderate ductility, good forming and bending characteristics, and can be drawn to a moderate degree. It can be brazed and

soldered with the same facility as chrome-nickel grades and except where resistance to high stresses is a major factor, it welds satisfactorily by the usual methods.

MicroRold 430 is used extensively for interior architectural trim, bar, restaurant and soda fountain components, table tops, etc. Washington Steel Corp. is currently producing polished sheets in standard sizes, 20 gauge and lighter, to replace chrome-nickel material vitally needed for the national defense program.

WASHINGTON STEEL CORPORATION

Washington, Pennsylvania



March 1, 1951

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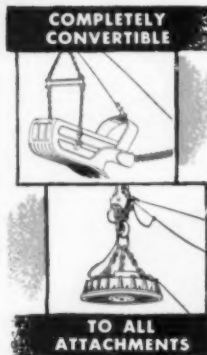


New UNIT 1520 Self-Propelled RUBBER-TIRED CRANE

20
TON
CAPACITY

Built by modern precision methods, the UNIT 1520 leads the field in quality, and dependable performance. Designed for both "on and off" highway operation. So compact, it works efficiently even in small, cramped quarters, "in or out" of the yard.

- Rugged Construction
- Perfectly Balanced
- Hook Roller Construction
- Operated by ONE Man
- Powered by ONE Engine
- Hydraulic Steering
- Air Brakes and 4 Speed Air-Actuated Transmission
- Heavy Duty, yet operated with remarkable SPEED . . . SAFETY . . . ECONOMY!



UNIT 1520 can be equipped with retractable high A-Frame to permit capacity loads on extended boom at long radius.



UNIT CRANE & SHOVEL CORPORATION

4817 W. BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.



SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • TRENCHES • MAGNETS

Canada Boosts Its Cobalt Prices 60 Pct to Spur Production

Ottawa — Canada's Trade Minister, C. D. Howe, announced that the government has boosted its cobalt prices by about 60 pct in order to increase production. Mr. Howe said the government will offer to buy cobalt at increased prices for a period of three years, with the Deloro Smelting & Refining Co., acting as its buying agent.

Cobalt is produced in northern Ontario, usually as a by-product of silver and nickel mines.

The government's new prices for ores and concentrates follow:

(1) \$1.35 per pound for contained cobalt, applicable to ores containing between 10 and 11.99 pct cobalt.

(2) \$1.40 per pound for contained cobalt, applicable to ores between 12 and 13.99 pct cobalt.

(3) \$1.45 per pound for contained cobalt, for ores containing 14 pct cobalt or more.

The ores and concentrates will be purchased by the Deloro company on the basis of assay determinations by the Temiskaming Testing Laboratory at Cobalt, Ontario, and in minimum lots of five tons.

Burlington Steel Co. Reports

Hamilton, Ont.—Burlington Steel Co., Ltd., reports profits for 1950, after taxes, of \$450,198. Net assets, as of Dec. 31, were listed as \$1,547,387.



"Having trouble parking Miss William . . . Allow me."

QUENCHING PRESSES TO MEET YOUR REQUIREMENTS

GLEASON NO. 16
QUENCHING PRESS

FIRST

Gleason Quenching Presses are an integral part of every industrial unit where the heat treatment of metal parts is required. If your needs are for a press capable of distortion-free quenching at faster production rates than heretofore possible, Gleason Works now provide three different models; the No. 16 with a 15" capacity, the No. 26 with a 24" capacity, and the No. 36 with a 36" capacity.

GLEASON NO. 26
QUENCHING PRESS

NEXT

and

NOW...

GLEASON NO. 36
QUENCHING PRESS

Note the advantages the New Gleason Quenching Press provide:

- Controlled quenching at faster and safer production.
- Simplified set-ups.
- Metallurgically correct oil flow.
- Safer loading.
- Quenching without distortion.

Write for literature. Send in prints of parts to be quenched for our recommendations.



GLEASON WORKS

1000 UNIVERSITY AVENUE · ROCHESTER 3, NEW YORK



**DO NOT
HANDLE
WITH CARE**

ALSiMAG®
Ceramic
STRAINER CORES

Are Tough!

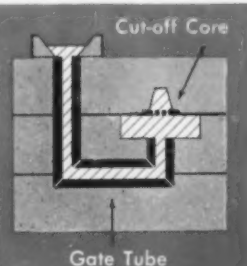
Foundries using ALSiMAG Strainer Cores have found that they save extra money by not having to give special treatment and extra care to these cores. They store almost anywhere and require only a minimum of space.

They are delivered to the molder in a handy carton, ready for use—now or a year from now. Do not deteriorate. And they take fast, rough handling—this speeds up your production.

ALSiMAG cores show little abrasion from metal stream. They allow a positive even flow of metal. Have even thermal expansion and withstand all normal pouring temperatures.

Many companies are using these cores today with great success in improved castings and increased production. Perhaps you, too, can find new profits by using them in your own foundry.

ALSiMAG CUT-OFF CORES save cut-off time by forming a weak joint between riser and casting. Made in many shapes and sizes. Cameron Cores Patent Number 2,313,517 sold to Meehanite Licensees only



ALSiMAG GATE TUBES are hard, smooth ceramic tubes for the incoming metal. Help keep castings cleaner and produce fewer rejects

FREE SAMPLES ON REQUEST: Samples of ALSiMAG Strainer Cores, Cut-Off Cores and Gate Tubes from sizes in stock are sent free on request. Test samples made to your own

specifications at reasonable cost. Test them in your own foundry. Keep a record of the results. You will see that ALSiMAG Ceramic Products pay for themselves many times over.

AMERICAN LAVA CORPORATION

CHATTANOOGA 5, TENNESSEE

50TH YEAR OF CERAMIC LEADERSHIP

OFFICES: Philadelphia • St. Louis • Cambridge, Massachusetts • Chicago
Los Angeles • Newark, N. J.

Proposed Plant to Produce Sulphur, Iron from Pyrite Ores

Toronto—Noranda Mines is considering plans for erection of a \$4 million plant for producing sulphur and iron from pyrite ores. It will probably be built at Hamilton, Ont. The company has been working on a process for producing sulphur from pyrite ores for the past 10 years.

H. L. Roscoe, vice-president of Noranda Mines, stated that the site has not definitely been selected. The proposed plant will treat 300 tons of pyrite a day and will produce elemental sulphur and sulphuric acid, with output of 150 tons of sulphur and 100 tons of sinter iron per day.

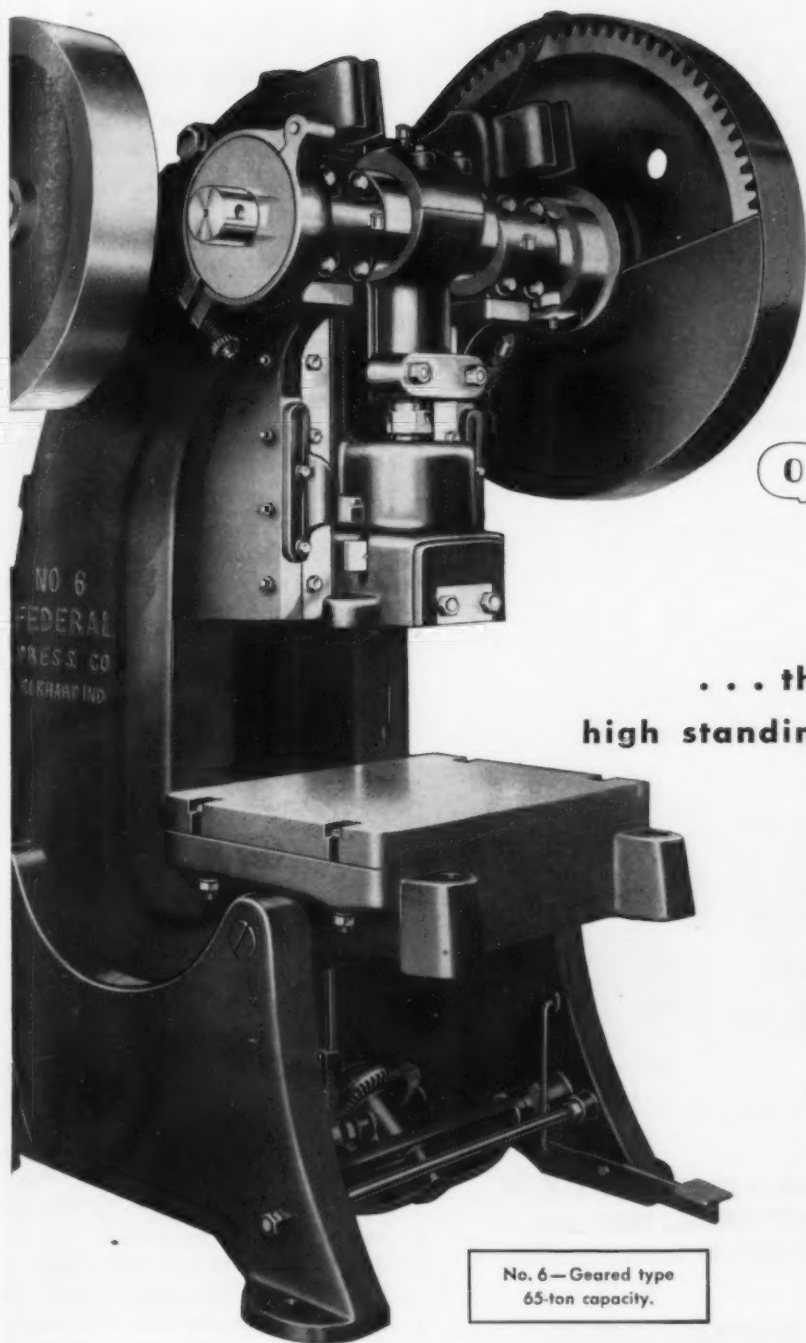
He said additional capacity will not be needed at Noranda Mines, Noranda, to obtain the necessary pyrite. The deep No. 5 zone with 100 million tons of pyrite ore and the lease on 50 acres of Macdonald Mines' property will provide a backlog of raw material for the proposed plant.

U.N. Group to Classify Coal

Geneva—The U. N. Economic Commission for Europe Coal Committee is drawing nearer to its goal of an international and commercially operable system of coal classification and nomenclature. Recently ECE scientists considered results of lab analyses of coal samples from ECE countries. Comparisons and tests to determine moisture, ash, carbon, and volatile matter content, calorific values and caking properties were made.

Table Cuts Inspection Time

New York—A table that cuts inspection time on coil strip metal by 25 pct has been designed by Riverside Metal Co. Using a specially designed table equipped with power rolls, both sides of a strip may be inspected in one operation, eliminating turnover and rewinding. The arrangement can be modified to accommodate many other types of material which must be unrolled for inspection.



No. 6—Geared type
65-ton capacity.

QUALITY PLUS

... the secret of **FEDERAL'S**
high standing among metalworkers!

Throughout the metalworking industry the name **FEDERAL** stands for quality *plus*. Built into every **FEDERAL PRESS** this extra quality includes such outstanding features as Timken Bearings, oversized crankshafts, solid web-type flywheels, symmetrical rams, longer "V" ways and gibs. It includes also a standard of workmanship that is seen in the *easy operation*, the *absence of down time*, the *longer life* of **FEDERAL PRESSES**. Make sure you get this *extra quality* when you next buy.

Write for catalog showing the complete line — 6 to 80 tons.

FEDERAL PRESS COMPANY

502 DIVISION STREET
ELKHART, INDIANA

FEDERAL *Open back
Inclinable* **PRESSES**

25 YEARS OF QUALITY CONSTRUCTION

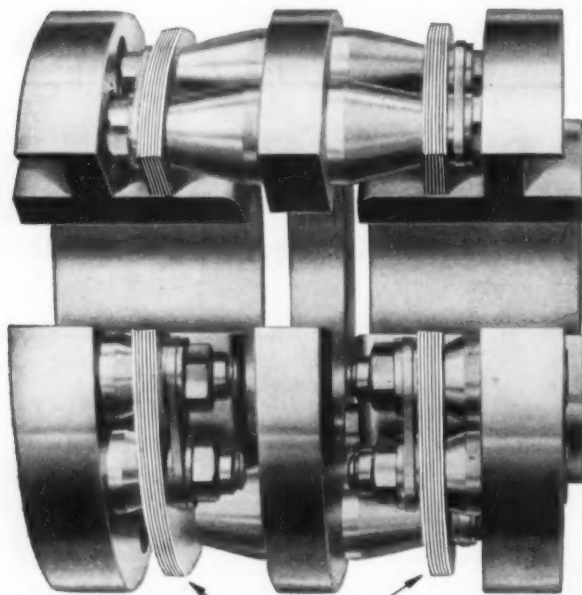
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

**BACKLASH
FRICTION
WEAR and
CROSS-PULL**
are eliminated
LUBRICATION IS
NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES
PERFECT BALANCE UNDER ALL
CONDITIONS OF MISALIGNMENT.

• • •

NO MAINTENANCE PROBLEMS.

• • •

ALL PARTS ARE
SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

• News of Industry •

Canadian Metal Controls Begin to Follow U. S. Pattern

Use of primary steel restricted in a wide field of construction.

Toronto—Canadian business is holding at all time record levels, but the pinch of defense demands is beginning to affect raw materials supply especially in steel and nonferrous metals. While domestic controls have not yet created too much havoc with steel buyers, many consumers are now feeling the effect of United States controls.

New steel controls have made their appearance and it is reported that others are pending. C. D. Howe, Trade Minister, has issued order No. 3 under the Essential Materials Act. This new order restricts the use of primary steel over a large field of construction, leaving unrestricted only such construction as factories, public utilities, works for transportation and other essential projects.

Construction Under Permit

Steel for construction of office buildings, hotels, restaurants, stores and other service establishments has been placed under permit, but no permits are required for steel to be used in the manufacture of construction accessories such as furnaces, plumbing supplies, etc.

The new order affects building construction only. So far there has been no attempt to restrict use of steel in manufacturing industries. Nuts and bolts used in construction are considered end products and are not affected by the new order. However, suppliers of these products are required to give the steel supplier a certificate that no materials will be used or resold by him for restricted construction.

Prove Public Interest

The permit system does not rule out the possibility that some construction on the restricted list might be allowed by the steel controller. But the permits will be issued sparingly for new products—only where a case of the public interest is established. They will

"no more GAMBLING on tool steel selection"



[1/3 actual size; Selector is in 3 colors]

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!
And you're sure you're right!!

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of picking the right tool steel right from the start is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" ... and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock ... that means when you get the answer, you can get the steel ... fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Crucible Steel Company of America
Dept. 1, Chrysler Building
New York 17, N. Y.

Gentlemen:

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

Name _____ Title _____

Company _____

Street _____

City _____ State _____

CRUCIBLE

first name in special purpose steels

TOOL STEELS

fifty-one years of Fine steelmaking

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DENVER • DETROIT • HOUSTON, TEXAS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

March 1, 1951

157

New BURNEK 22

best for your barrels



BURNEK 22* is Wyandotte's new burnishing compound. Burnek 22 is ideal for brass, copper, nickel, silver and gold. And it's useful for some operations on aluminum and its alloys, zinc, steel and stainless steel.

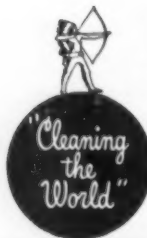
Try Burnek 22 for barrel finishing with steel balls or shapes, small burnishing stones or chips, or self-tumbling. Your Wyandotte Representative will be glad to recommend the proper concentrations.

*Trade-mark

BURNEK 22

for barrel burnishing brass,
copper, gold, nickel and silver
and some operations on aluminum,
steel, stainless and zinc

- produces high luster fast
- rinses freely
- dissolves quickly and completely
- lowers unit cost
- reduces running time
- maintains true metallic color
- performs well in hard or soft water
- insures uniform results
- permits storage of steel media in solution



THE WYANDOTTE LINE—products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray booth compounds. An all-purpose floor absorbent: Zorball—in fact, specialized products for every cleaning need.

Wyandotte Chemicals Corporation
WYANDOTTE, MICHIGAN

Service Representatives in 88 Cities



• News of Industry •

be given more freely for projects on the restricted list which already are under construction.

The permits do not guarantee delivery of steel, actually they will be only a hunting license, as the builder must search for himself to get steel. The only formal priorities at present are actual defense orders. The steel controller is making sure that defense support orders and projects get the first claim on steel.

At the same time restrictions on use of steel were started, the Trade Dept. clamped down on all export of vital materials, particularly cobalt, tungsten, iron and steel fence posts and more than 100 other items for export to anywhere but the U. S.

Materials in particularly short supply include many necessary to construction such as steel, nails, copper and brass tube and strip, aluminum, monel.

Voluntary Allocation, Too

Where there are no government controls distributors have set up voluntary allocation plans to protect their regular customers and themselves. Buyers have been advised to place orders for late summer and fall delivery and in some lines to order for next winter.

However, the steel mills are fully booked through first quarter and are reticent in accepting booking for second quarter until the situation has been clarified. Few suppliers are taking on new customers; they are allocating present supplies on a percentage basis of last year's purchases. Warehouse suppliers report that their purchasing problems are even more complex than their customers'.

Italian Mill Orders GE Equipment

Schenectady — Italy's largest single order for General Electric steel mill equipment was placed with the International General Electric Co., Inc., by the Societa Italiana Accierie Cornigliano, Genoa. The \$2 million order covers electrical equipment for four cold mills, providing a total connected main drive of almost 20,000 hp.

The most economical mover of metals available



DINGS NEW LIFTING MAGNET
Improved these ways . . .

BIG IMPROVEMENTS LIKE: moisture-proof, shock resistant all welded construction • A finer insulating compound—vitally important because of its ability to dissipate strength-sapping heat • Four point chain suspension—another Dings exclusive—for less swinging and tipping, bigger loads and much better all around control • *Scientifically balanced magnetic circuit*—the crux of a great magnet—means all magnetic strength into the lift. Proof of this lies in the extremely low heat rise.

LITTLE IMPROVEMENTS LIKE: protector plate guards, waterproof, shatterproof, jerk resistant molded neoprene neck cable connectors, tamper-proof sealed terminal box and many, many others.

THEY ALL ADD UP TO: the new Dings lifting magnet—successfully designed for lighter weight, bigger payload and longer life.

DINGS MAGNETIC SEPARATOR COMPANY
4709 Electric Ave., Milwaukee 46, Wisc.

Dings Magnets

World's Largest Builder of Electric and Non-Electric Magnetic Separators for All Industry

LIGHT!



IN PROPORTION TO
LIFT!

**MOISTURE-
PROOF!**



IT'S
ALL WELDED

**A COOL
OPERATOR**



LOW HEAT RISE
MEANS MORE LIFT!

**TROUBLE-
FREE!**



**A DOZEN NEW FEATURES
KEEP IT THAT WAY!**

Get Details on Why This New
Dings MOVES MORE, FASTER,
AT LESS COST. Send Now for
the Lifting Magnet Catalog.



PERKINS produces precision AIRCRAFT GEARS to the exacting specifications of the country's largest engine builders

Perkins is exceptionally well equipped to produce — to customers specifications — all types of gears for aircraft engines or for any other application. In addition to modern machine tools, we have facilities for grinding and shaving teeth, and for heat treating as indicated by specifications. Write for our new bulletin, PERKINS GEARS for full data on our gear engineering facilities.

PERKINS MAKES TO CUSTOMERS' SPECIFICATIONS IN ALL MATERIALS, METALLIC AND NON-METALLIC: bevel gears, ratchets, ground thread worms, helical gears, worm gears, spiral gears, spur gears with shaved or ground teeth

↓ One of many steps in the inspection of Perkins' Aircraft Engine Gears



PERKINS MACHINE & GEAR company
WEST SPRINGFIELD, MASSACHUSETTS

Rust to Build Pit Controls

Pittsburgh—Engineering services and material for automatic controls on one 4-hole battery of regenerative soaking pits at the U. S. Steel Co. South Works, Chicago, are being furnished by Rust Furnace Co.

The contract includes automatic controls for temperature, combustion, and furnace pressure. Pits will be equipped to fire a mixture of blast furnace and natural gas, or a mixture of blast furnace gas and fuel oil.

Commercial Shearing to Build

Youngstown, Ohio—Commercial Shearing & Stamping Co. will build a \$1 million fabricating plant at Salt Lake City. Construction is scheduled to begin May 1, and the plant is expected to be in production by late summer. An 80 by 300 ft fabricating plant will be built on a 20-acre site. While originally planned to produce tank heads and steel tunnel supports, the plant probably will be devoted largely to defense work.

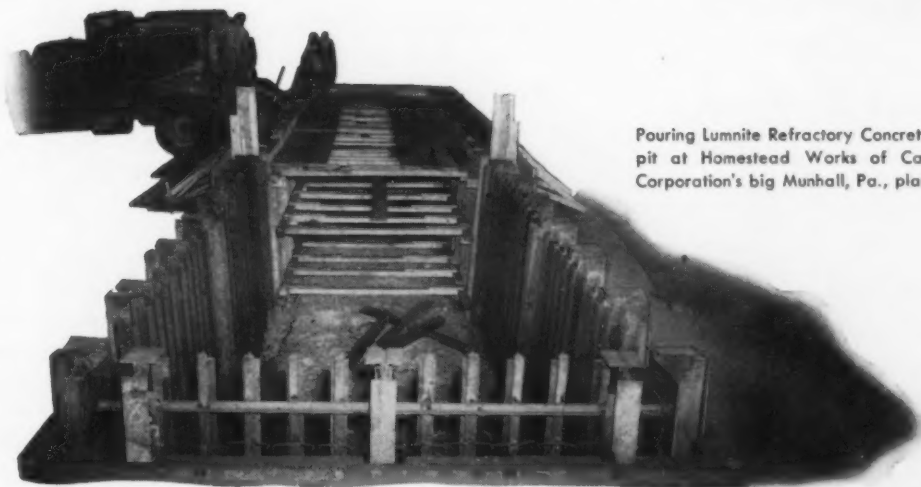
Packard Earns \$5 Million

Detroit—Directors of Packard Motor Car Co. have declared a dividend of 20¢ per share. Hugh J. Ferry, president, said, "indications are that Packard earnings for the year will be slightly in excess of \$5 million." Ferry recently told directors of the company the ground work for extensive participation in military programming is under way. Details will be divulged as security regulations permit, the Packard executive said.

B&O R.R. Gets New Lounge Cars

Baltimore—Two new observation lounge cars have been placed in service by the Baltimore & Ohio R.R. on the Baltimore-Detroit run. Each car accommodates 26 persons, and has five double bedrooms. The cars have sides of corrugated stainless steel up to the window level, and were produced by Pullman Standard Car Mfg. Co.

Place Refractories **FASTER** with Lumnite* Refractory Concrete



Pouring Lumnite Refractory Concrete for a slow-cooling pit at Homestead Works of Carnegie-Illinois Steel Corporation's big Munhall, Pa., plant.

YOUR REFRACTORY JOBS get into production in *hours*, instead of days, by using Lumnite Refractory Concrete!

Why? Because simple monolithic construction replaces thousands of small units. Walls aren't laid up. They're poured! Moreover, Lumnite reaches service strength in 24 hours, or less. If needed, repairs and maintenance can be made quickly and easily with a minimum of outage time. For Refractory *Insulating* Concrete, simply change the aggregate, at no extra cost!

Lumnite calcium-aluminate cement has a proved time- and cost-saving record—not only for slow-cooling pits, but for many types of oven and furnace walls, door linings, arches, car tops, floors and

base pads; stack linings, flues and foundry floors. In these installations, and many others, it gives consistently better refractory service, under severe thermal shock.

CASTABLES ADD CONVENIENCE. Many prefer to buy prepared castables. These packaged mixtures of Lumnite and selected aggregates are tailor-made to meet your specific temperature and insulation requirements. Add only water. You can buy them from refractory manufacturers and dealers.

For more information about Lumnite, write Lumnite Division, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.



IF RECORDS mean anything, this Lumnite Refractory Concrete slow-cooling pit will still be going strong 5 to 10 years from now even though it absorbs constant battering and thermal shock.



NEED 'EM FAST? By pouring Refractory Concrete, as in this slow-cooling pit, you can save many hours, even days, over other types of refractory construction.

"LUMNITE" is the registered trade mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

LA-L-87

ATLAS®

LUMNITE for INDUSTRIAL CONCRETES

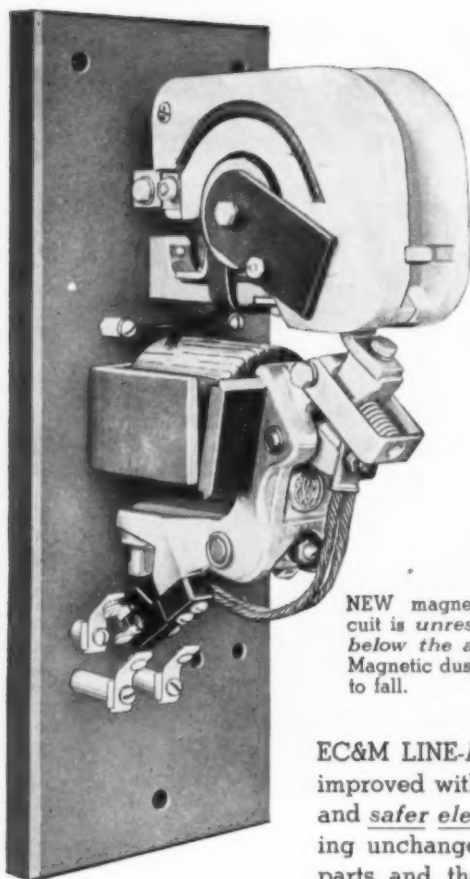
REFRACTORY, INSULATING, OVERNIGHT, CORROSION-RESISTANT



"THE THEATRE GUILD ON THE AIR"—Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network

March 1, 1951

161



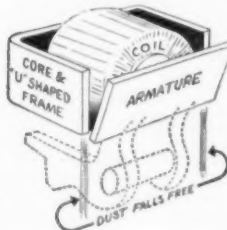
Improved

EC&M Line-Arc CONTACTORS

CUT OPERATING COSTS

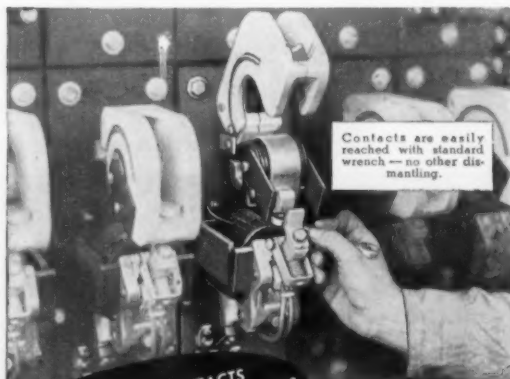
on Motor Control, Power and
Lighting Circuit Switching

NEW magnetic circuit is unrestricted below the air gap. Magnetic dust is free to fall.



EC&M LINE-ARC Contactors have been improved with a new magnetic circuit and safer electrical interlocks. Remaining unchanged are all current-carrying parts and the well-known EC&M LINE-ARC principle, which provides high arcing ability and long contact life through cool contact operation.

QUICK
CONTACT
RENEWING,
TOO
Encourages
GOOD
MAINTENANCE



FRONT AND REAR CONTACTS
REPLACED IN LESS THAN 2 MINUTES

The LINE-ARC principle keeps contacts cool. Cool contacts result from quick transfer of the arc to the arcing plate and circular guard over the blowout coil. The LINE-ARC principle causes the arc to leave the contacts quickly—oscillograms show that the arc is transferred in 1-500th of a second.

Write for NEW BULLETIN 1145-D

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79th STREET

CLEVELAND 4, OHIO

Westinghouse Gets Big Job From Plantation Pipe Line Co.

Pittsburgh — The Plantation Pipe Line Co. has awarded a \$600,000 contract to Westinghouse Electric Corp. for electrical equipment necessary for the expansion of the system.

C. R. Younts, president of Plantation, stated that the contract provides for switchgear, motor starters, control centers, and ventilating fans. The additional equipment and pipe line will boost the capacity of the system from approximately 100,000 to 167,000 barrels per day, Mr. Younts said.

Mr. Younts reported that work on the new line began late in 1950 and will be completed the latter part of 1951. The expansion program will cost an estimated 52 million dollars.

Strategic Cobalt Used In Many Military Applications

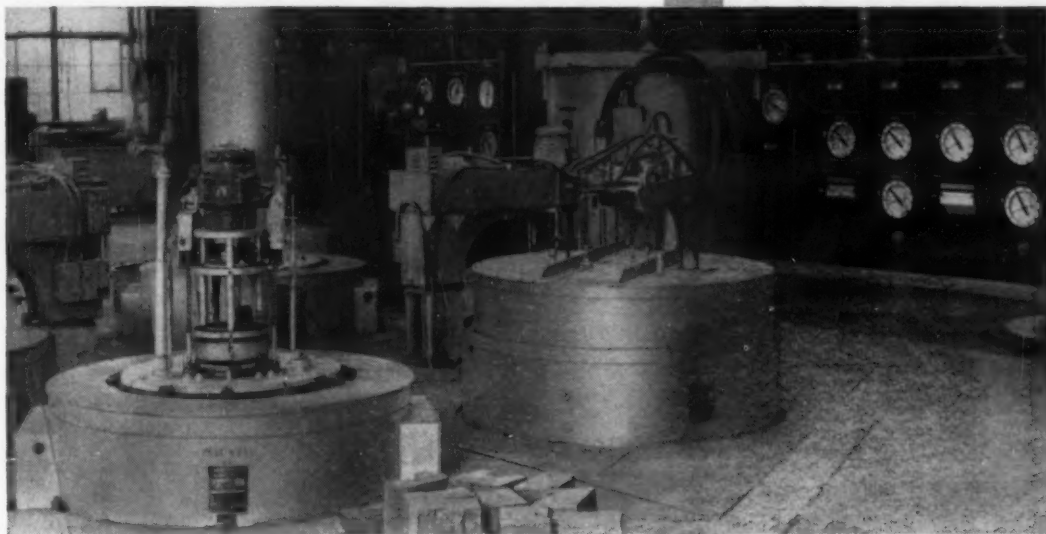
New York — Cobalt, the first strategic metal to be placed under virtually complete government control because of the military requirements is an increasingly important element in making special alloy steels, according to American Iron & Steel Institute. Because this tough, silvery white metal is used in such critical items as jet engines, gun barrel linings and radar, purchases of more than 25 lb must have government approval.

"Superalloys," also containing tungsten, chromium and molybdenum, constitute the most rapidly expanding use of cobalt. Permanent magnet steels, such as those used in radio and television speakers and in radar equipment are the largest single consumers of the element. Porcelain enamel coatings for steel also contain cobalt. Additional cobalt is used by the steel industry in cemented carbide dies for cold drawn bars and wire, and in hard facing for dies. An essential property of the element is its heat resistance.

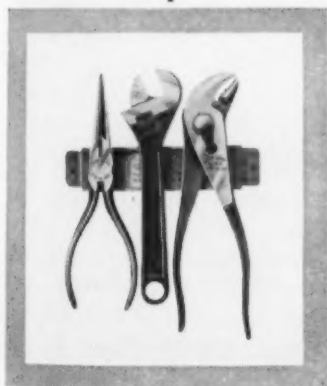
Consumption of cobalt for steel-making purposes in 1950 may

HEVI-DUTY FURNACE *Plus* *ElectroniK* CONTROL

BROWN INSTRUMENTATION IS THE
Plus-Factor



MAKES BETTER QUALITY UTICA TOOLS



The need for flexibility with economical, uniform production is making increased demands upon heat-treating equipment and instrumentation.

Such a combination is found in the plant of Utica Drop Forge & Tool Corporation at Utica, New York. Here, savings are made through the teamwork of Hevi-Duty vertical retort carburizing and nitriding furnaces and recording *ElectroniK* controllers. Protection for furnaces and work is provided by Brown excess temperature cut-offs. Typical of the flexibility and quality made possible by such equipment is the ease with which production is changed from pliers and wrenches to turbine and compressor blades.

Multiple-zone temperature control plus the use of controlled atmospheres permits extremely precise regulation of heats. Such dependable performance is being repeated by *ElectroniK* indicating and recording controllers throughout the metals industry . . . delivering top-quality, economical production.

Call in your local Honeywell engineer for a discussion of your utilization of *ElectroniK* control . . . he is as near as your phone!

MINNEAPOLIS-HONEYWELL REGULATOR Co., Industrial Division, 4483 Wayne Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

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BROWN INSTRUMENTS

CASE No. 417
Bearing Manufacturer

INSTALLATION COSTING \$3,475

... paid for itself in one year ...
Principle applied to four plants

- (a) Savings in Effort (estimated) 20%
(b) Savings in Time.....50%
(c) Savings in Space (estimated) 10%

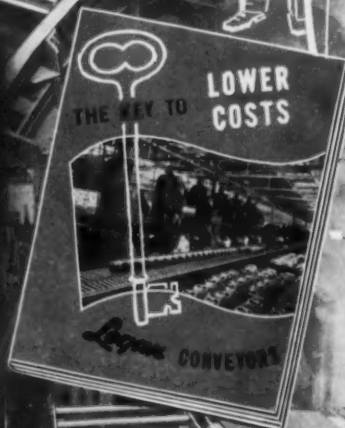
QUOTING CUSTOMER'S* STATEMENT:

"We started with a short section of gravity roller conveyor between a production milling machine and double stand grinder handling castings that average 25 lbs. Our former production was 1200 pieces. As a result of the conveyor, this has been increased to 2400 pieces with a maximum of 2800 pieces attained in 8 hours. The handling was previously done by using a channel chute into a box and grinders had to pick-up work from this box before they could handle the piece on the grinding wheel. With the conveyor line installed, work comes at a convenient height so that the operator grasps the next piece with little effort. The first unit paid for itself in one week. Result: Roller conveyor was extended between all operations in the finishing department. Savings paid the cost of the system in one year."

*Name on Request

Here's a true case history where production was more than doubled by the installation of a Logan Conveyor system. If you have a handling problem write us. You may find an answer in this book, "Key to Lower Costs."

Send for it today. →



Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE, KY.

• News of Industry •

have exceeded the record 991,645 lb used in 1949, on the basis of Bureau of Mines figures for three-quarters of last year.

Although the U. S. is the world's largest consumer of cobalt, most of it must be imported. In recent years, Belgian Congo, Northern Rhodesia, Canada and French Morocco, with the United States, have accounted for about 95 pct of world output.

Commercial domestic production of cobalt metal at present is almost entirely the by-product of iron ore mining in Pennsylvania. Between 500,000 and 700,000 lb of cobalt are produced annually at this source. However, by the end of 1952 the U. S. is expected to have an additional 3.5 million lb of domestic cobalt capacity. A deposit near Salmon, Idaho, may yield much. A lead and zinc mine near Fredericktown, Mo., plans to recover about 500,000 lb of the element a year from concentrates saved from regular operations. A mine near Cobalt, Ontario, is planning to recover about 750,000 lb annually from silver ores.

Firm Markets Steelsaver Coating

New York—After field tests of a dozen years, a high-gloss coal tar protective coating, Steelsaver, is being produced in commercial quantities by Continental Coatings Corp., of New York and South River, N. J. Steelsaver is designed to preserve metals and other materials with a tough, elastic film.

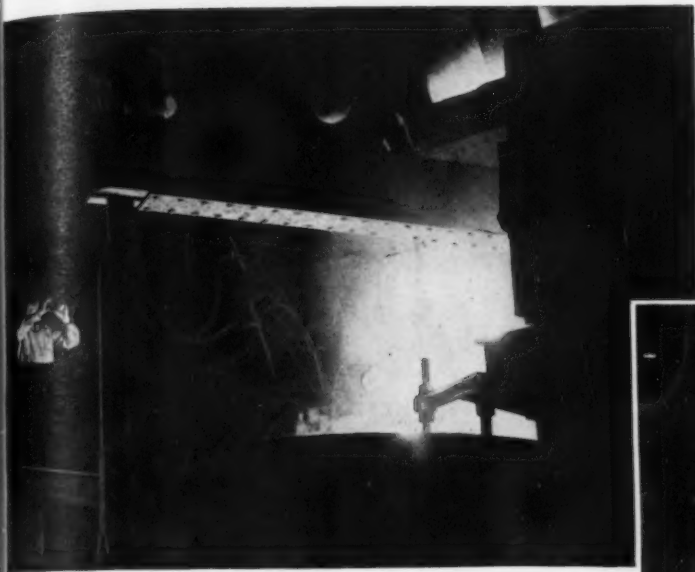
To Ask OK for Debt Increase

Pittsburgh — Stockholders of Pittsburgh Steel Co. will be asked at the Apr. 10 meeting to approve an increase in authorized company indebtedness to \$50 million from the present \$5 million.

National Earns \$57,814,974

Pittsburgh — National Steel Corp. has reported net earnings of \$57,814,974 for 1950 compared with \$39,311,269 for 1949. Fourth quarter 1950 earnings were \$14,723,643.

HERE'S THE STORY OF YOUR FORGINGS AT NATIONAL FORGE AND ORDNANCE CO.



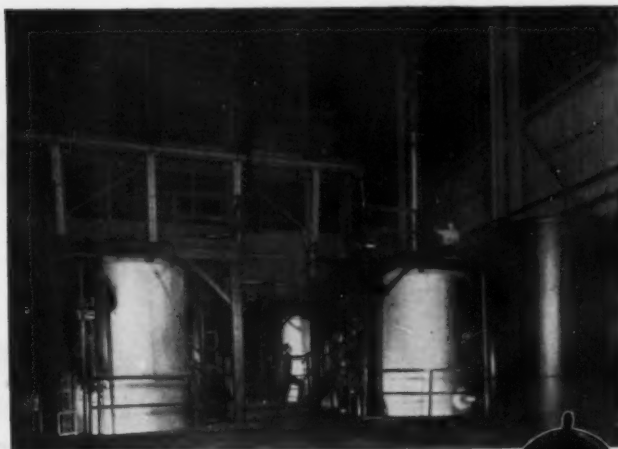
1. Basic Electric Steel is made for all forgings.



2. Forgings are made from Ingots of proper size for the best final result.



3. Forgings are rough-machined before heat treatment to insure greatest uniformity.



4. The heat treating equipment is adapted to the job to be done.



5. National Forge can make your forgings—large or small—rough or finished.

6. Precision is a by-word at National Forge.



NATIONAL FORGE AND ORDNANCE CO., IRVINE, WARREN CO., PENNA.

Remember

Ingersoll produces all 3

STEELS
THAT RESIST
CORROSION

STEELS
THAT RESIST
HEAT

STEELS
FOR LOWEST COST
STAINLESS
PROTECTION



Most users of Stainless-Clad steel know the 20-year record of IngAclad. Countless applications in all of the Process Industries have proved its dependability and real economy. Where protection has been needed on *both* sides of the metal, Ingersoll solid stainless sheets have also had wide acceptance.

But do you know that Ingersoll heat-resisting steels have also made an outstanding record in such applications as furnaces, ovens, etc., where excessively high temperatures are applied?



Ingersoll STEEL DIVISION

BORG-WARNER CORPORATION

310 South Michigan Avenue, Chicago 4, Illinois
Plants: Chicago, Illinois; New Castle, Indiana; Kalamazoo, Michigan

• News of Industry •

Boosts Silicone Resins As Protective Coatings in Industry

Pittsfield, Mass. — Because of the unique properties of silicones, technical men in the paint, varnish, and lacquer industry, as well as those manufacturers who use protective coatings, should become better acquainted with silicone resins and oils, stated J. W. Reynolds, assistant manager of Chemicals Div. of General Electric's Chemical Dept., in a talk before the National Paint, Varnish, and Lacquer Assn.

There are an infinite number of molecular combinations which will produce silicone resins for coating applications, he stated. To date only a tiny fraction of the possible have been produced commercially.

Budd RDC Orders Grow

Philadelphia — The Pennsylvania-Reading Seashore Lines have ordered six more (total of 12) self-propelled Rail Diesel Cars manufactured by the Budd Co. Delivery is expected to be in time for the 1951 summer season. Since their introduction last year, 31 RDC cars have been ordered by domestic railroads.

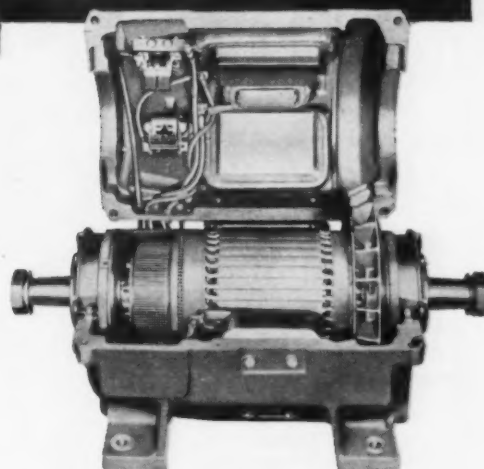
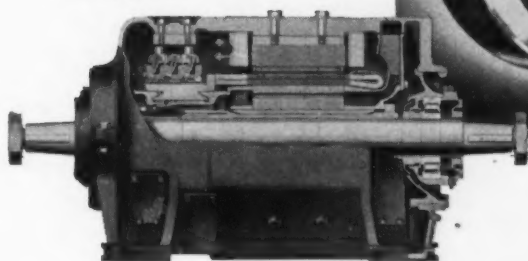
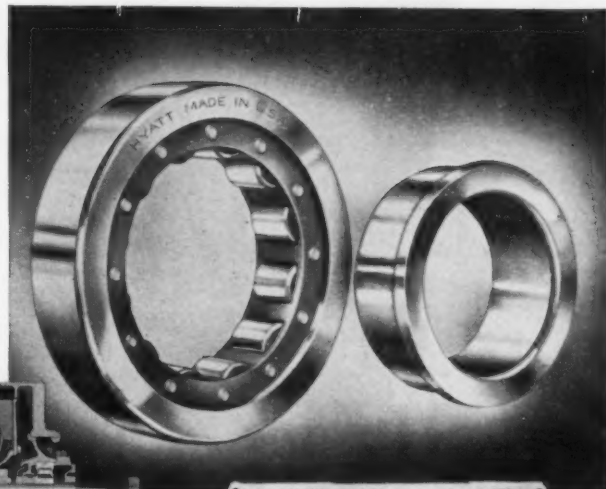
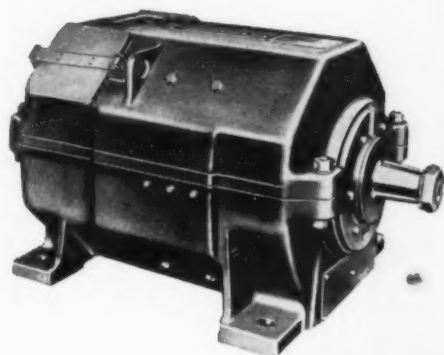
New Aluminum Alloy Rivet

Pittsburgh—Aluminum Co. of America has developed a new aluminum alloy rivet in the large size range with an average shear strength of 38,000 psi within 2 weeks after driving. This strength is considerably greater than anything ever before available in this size range. The new rivet alloy has been designated temporarily as "XB77S."

Artkraft to Make Powder Cans

Lima, Ohio—An order for 200,000 galvanized powder cans will go into production at the rate of 1000 per day within 2 months at the Artkraft Mfg. Corp.'s plant here. The \$1 million contract was awarded by the Bureau of Ordnance.

HYATT Protection for your Mill Motors



*Hyatt Hy-Load Bearings are used
in Mill Motors built by*

**Elliott Crocker-Wheeler
General Electric
Westinghouse**

Hyatt Hy-Load Roller Bearings are just what the name implies . . . high capacity radial type bearings built for heavy service, long life and freedom from wear and care.

Assembly and disassembly is easy with Hyatt Hy-Load Roller Bearings. Separable construction with flanged races keeps lateral play within prescribed limits yet allows the armature to center itself electrically.

To be sure you get all these Hyatt advantages specify Hyatts by name on all new mill motor purchases. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS



Style WUG
Universal Gas Mask

Safe—Comfortable—Dependable

WILLSON

Gas Masks For Every Hazard



Style WHG
Emergency Type



Style WIG
Industrial Gas Mask



Style WTG
Tank Gaugers' Mask


WILLSON
Dependable Products Since 1870
*T.M. Reg. U.S. Pat. Off.



For effective protection against acid gases, organic vapors, carbon monoxide, fumes, mists, smokes and similar hazards, there is a WILLSON Gas Mask approved by the U. S. Bureau of Mines. They have been designed with every consideration for worker safety and comfort. A selector table and complete information on various types is included in our new catalog. Ask our nearest distributor for a copy—or write direct to WILLSON PRODUCTS, INC., 231 Washington Street, Reading, Pa.

publications

Continued from Page 34

ing device, operated from any 110-v ac convenience outlet, which welds studs up to 1/2 in. and can be easily transported in a trailer. *Nelson Stud Welding Div., Morton Gregory Corp.*

For free copy insert No. 9 on postcard, p. 31.

Steel Weight Table

A comprehensive new weight chart gives data for all standard sizes of round, square and hexagon cold finished steels. The listing for finished steel rounds includes weights for all standard diameters from 3/16 to 6 in., 1-in. to 24-ft lengths. A separate table for square and hexagon steel bars shows the weight per inch and per foot for all standard sizes, from 1/32 to 6 in. *Wyckoff Steel Co.*

For free copy insert No. 10 on postcard, p. 31.

Manpower Resources

Population changes during the past decade that have significantly affected the availability of manpower are analyzed in the BLS "Fact Book on Manpower." The fact book reviews major aspects of the nation's manpower situation, including data on potential civilian and military resources under conditions of national emergency. Tables, charts and text material summarizing basic information on the U. S. working population are presented. *Bureau of Labor Statistics.*

For free copy insert No. 11 on postcard, p. 31.

For Production Control

Quick and accurate answers to production and inventory control questions are contained in a new 40-p. booklet offering a remedy for bottlenecks in production before they become acute. Efficient and accurate record-keeping management is highlighted in the booklet. Punched card methods are shown for every phase of production control, including: engineering records and procedures, production and forecastings, materials controls scheduling and progress reports. The how of scheduling defense orders for regular as well as new productions without delay or disorganization, processing produc-

tion orders according to schedule, accurate delivery dates based upon correct information on raw materials and machine facilities, are all covered. *Remington Rand Inc.*
For free copy insert No. 12 on postcard, p. 35.

Plating Bath Additive

Typical reactions of dihydroxy diphenyl sulfone are described in a new data sheet containing information on two forms of mixed isomers of the chemical, available in commercial quantities, and two purified isomers, which can be supplied in experimental amounts. Suggested uses for the sulfone or its reaction products include an electroplating bath additive, tanning agent resins, a stabilizer for cellulose materials, and adhesive formulations. *Merrimac Div., Monsanto Chemical Co.*
For free copy insert No. 13 on postcard, p. 35.

Lift Truck Data

A new 4-p. standard specifications folder contains complete data on Towmotor fork lift trucks, tractors and electric pallet trucks. Such information as capacities, load centers, lift heights, weights, dimensions, turning radii and speeds of travel is given for a variety of models. *Towmotor Corp.*
For free copy insert No. 14 on postcard, p. 35.

Power Shear Folder

A new 4-p. folder introduces the new Jacques power shear for fast production cutting from rolls or sheets of material from paper and plastics to laminations and light metals. In either semi- or fully-automatic models the bulletin pictures the shear's versatility in both feed and receiving set-ups, as well as many types of controls. Special safety features are also described, along with various applications and specifications. *Hobbs Mfg. Co.*
For free copy insert No. 15 on postcard, p. 35.

Contract Stamping

The 16-p. booklet entitled "3-Way Facilities for Precision Stampings," describes how Volkert takes over an intricate stamping problem completely—from creating or modifying the design, to engineering and manufacturing the tools and dies through to producing it in volume on automatic presses. A

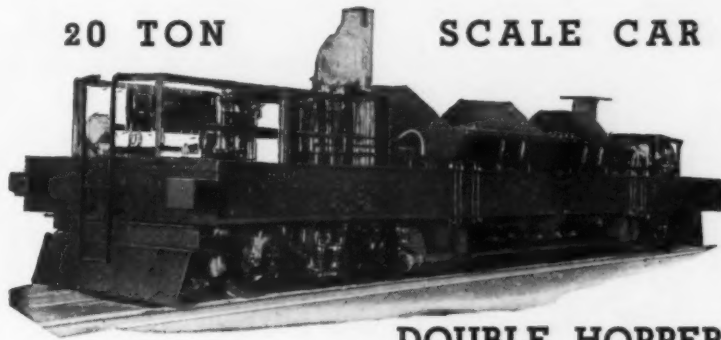
ATLAS

INTRA-PLANT CARS

DESIGNED AND ENGINEERED
FOR YOUR SPECIFIC NEEDS

20 TON

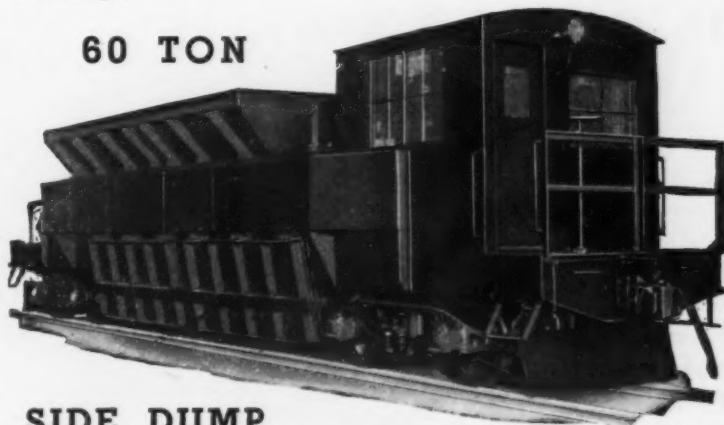
SCALE CAR



DOUBLE HOPPER
BOTTOM DUMP

Car has Atlas underslung suspension scales with Atlas 24" Scale Dial with chart recording. Air brakes and air-operated discharge gates. Cast steel side-frame trucks with Roller Bearings.

60 TON



SIDE DUMP
ORE TRANSFER CAR

900 cu. ft. capacity, two-section hopper with electric heaters. Each section has independently-operated discharge gates. Car is equipped with air brakes, automatic couplers, headlights and whistle. Each truck mounts one 75-HP motor.

Atlas Engineering Service is always at your service.



THE ATLAS CAR & MFG. CO.

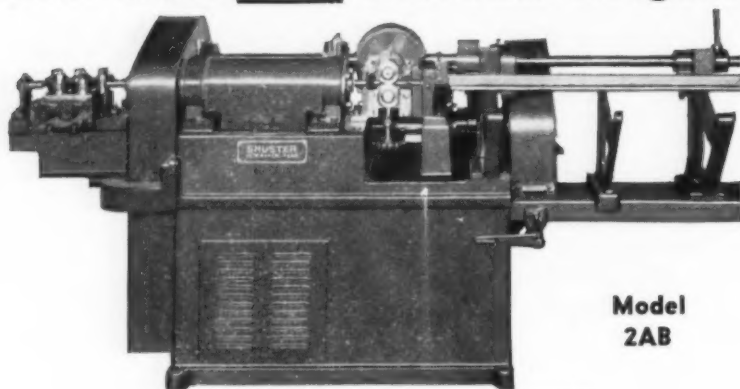
ENGINEERS

MANUFACTURERS

1140 IVANHOE RD.

CLEVELAND 10, OHIO U.S.A.

This New, Economical **SHUSTER** Cuts Costs AND Accurate Lengths!



**Model
2AB**

Capacity: 3/16" dia.—1/2" dia. (BASIC WIRE)

Automatic

WIRE STRAIGHTENING AND CUTTING MACHINE

This new "SHUSTER"—with its five gear-driven straightening rolls—handles even badly twisted wire with ease. Square and rectangular as well as round wire may be straightened and cut to exact lengths. Other "Shuster" features that assure high speed, quality production are: almost continuous wire travel, rapid cut-off, V-belt motor drive, ball and roller bearings, and extreme rigidity throughout. Write for details.

Mfd. by METTLER MACHINE TOOL, INC.

132E Lawrence St.

New Haven, Conn.

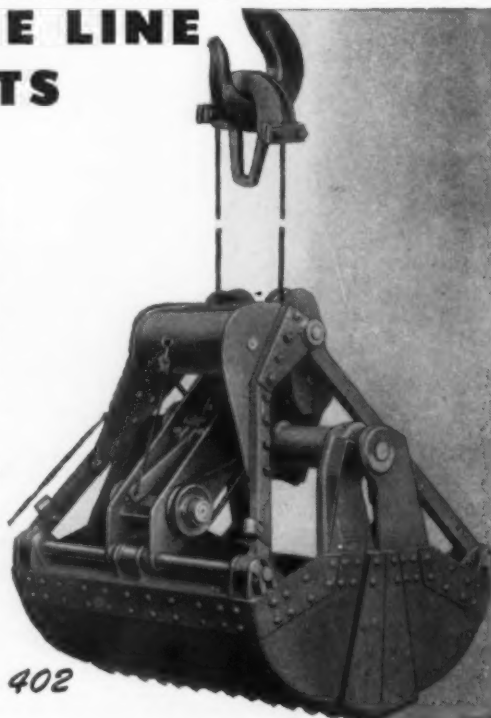
Representatives in all principal cities and foreign countries.

ERIE SINGLE LINE BUCKETS

ILLUSTRATED is the hook-on type, for intermittent service. It is reeved and ready for operation on overhead traveling crane, monorail hoist, locomotive crane, derrick, ships tackle or any other hoisting device which has but a single hoisting drum available for bucket duty. Just slip the yoke over the crane hook.

Erie Single Line buckets are also available in the direct-reeved type for permanent installation. Describe your Single Line bucket need—we'll give you our recommendations for we build all types and sizes.

● *Write for Booklet 402*



ERIE

STEEL CONSTRUCTION COMPANY

813 GEIST ROAD • ERIE, PENNSYLVANIA



publications

Continued

typical engineering-tooling-stamping problem of a radio tube manufacturer is described in detail, showing how costs were cut 50 pct. Of interest is a series of photographs of five progressive dies for producing complex stampings in high-production quantities. *John Volkert Metal Stampings, Inc.* Address requests to this column on company letterhead.

Electronic Components

In addition to a standard line of fixed and variable resistors, line and slide switches, iron cores, choke forms and "gimmick" capacitors, a new 42-p. catalog lists several newly-cataloged items. These include single, dual shaft and special purpose volume controls, new 3-amp slide switches, and Stackpole Ceramag non-metallic cores in "U," "E," width control and segmented deflection yoke types for modern television uses. Complete mechanical and electrical specifications simplify component selection. *Electronic Components Div., Stackpole Carbon Co.*

For free copy insert No. 16 on postcard, p. 35.

Snap Flasks

A new 4-p. price list presents general specifications and describes construction features of V-G cherry snap flasks. Complete price information on the flasks, hardware, face and bottom boards is listed, and the folder shows details of the malleable iron fittings and pin assembly. *V-G Flash & Fitting Co.*

For free copy insert No. 17 on postcard, p. 35.

Hydraulic Jacks

The complete line of Buda ratchet, screw and hydraulic jacks, in capacities ranging from 3 to 75 tons, is described in a new 16-p. bulletin with table of contents arranged according to jack models and by industries in which they are used. Also included is a helpful selection table, application pictures, and information on recommended uses and special features of jacks. Detailed specifications for more than 130 different models and sizes are shown. *Buda Co.*

For free copy insert No. 18 on postcard, p. 35.

Resume Your Reading on Page 35

production ideas

Continued from Page 38

a series of blows with the slapper. The form block and workpiece that are clamped to a steel table, are rotated as required, to cover the entire perimeter. Frequency of the blow can be altered to suit conditions. A planishing machine incorporates an air-driven hammer assembly mounted on a smooth table top. A series of short rapid blows of the hammer that is activated by pressure of the work against the head itself quickly removes minor defects producing a smooth finished surface. Shape of the removable workhead used on the planisher is chosen to suit the job. Both machines operate on the ordinary plant air supply. *Hufford Machine Works, Inc.*

For more data insert No. 33 on postcard, p. 35.

Air-Gage Tracer

Built-in hydraulic cylinder; short air lines; traveling power unit.

A second type of single cylinder air-gage tracer incorporates design modifications to adapt it more advantageously to use on 12, 16 and



20-in. Series 60, Models M, N and NN Monarch engine lathes. A built-in hydraulic cylinder lends great compactness and rigidity to the slide mechanism; hydraulic and air lines are short; and a power unit travels with the carriage on a track at the rear of the template support. Advantage of the traveling power unit is that there is no limit on the length of lathe to which the Type C air-gage tracer can be effectively applied. Because the template support rail is mounted low at the rear of the bed and the tracer supporting arm extends to the rear beneath the workpiece,

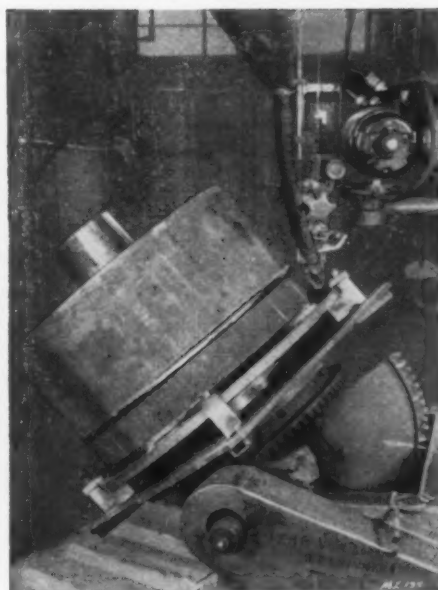
FOR QUALITY WELDMENTS

call in

VAN DORN"

• You can be sure of outstanding quality if your weldments are produced by Van Dorn. For Van Dorn has complete fabricating facilities... experienced design engineers... specially trained workmen... 77 years' experience in metal working.

Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th St., Cleveland 4, Ohio.



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FREE WELDMENT BOOK



Profusely illustrated; describes the many advantages of Weldments, and Van Dorn's extensive facilities.

ARMSTRONG *Carbide* TOOL HOLDERS

**For
Higher
Speeds,
and Heavier
Feeds**



ARMSTRONG Carbide Tool Holders and ARMIDE (Carbide Tipped) Cutters come in cased sets for tool rooms and maintenance departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachineable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.

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ARMSTRONG BROS. TOOL CO.

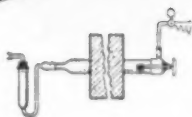
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Speed Lab Work-- Cut Costs



McDANIEL
High Temperature
**COMBUSTION
TUBES**



Favorites in metallurgical laboratories throughout America, McDaniel Combustion Tubes never spall or blister. They are gas-tight, highly resistant to thermal shock and precision made in every detail. Carbon and sulphur determination work goes smoothly with McDaniel Tubes—and control costs are kept at lowest level.

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"McDaniel Industrial Porcelains"

Refractory Porcelain
Specialties in stock
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Flasks, retorts, cru-
cibles, etc. and
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job.

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production ideas

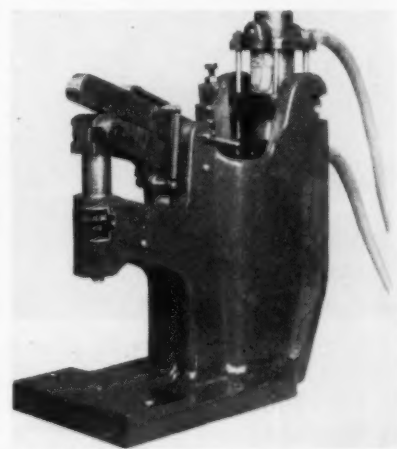
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extra large and extra long work may be loaded and unloaded with the same ease as on a conventional lathe. Ample power to hold and to drive the cutting tool is provided by the large hydraulic cylinder. Rate of feed and depth of cut are limited only by the cutting tools and the size of the lathe used. Air-gage tracer equipped Monarch lathes may be used as manually-operated machines for the usual turning, boring, facing and threading operations. Controls are centralized in a small three position lever at the front of the hydraulic slide. The new air tracer design is available in swiveling and rigid types. *Monarch Machine Tool Co.* For more data insert No. 34 on postcard, p. 35.

Staking Machine

**Air operated, double action;
rivets fixed or movable joints.**

Adaptability of the new staking machine covers such operations as eyeletting, inserting grommets, burring, and pointing with platinum, tungsten or silver. The spindle is constructed with a pressure pad that compresses or as-



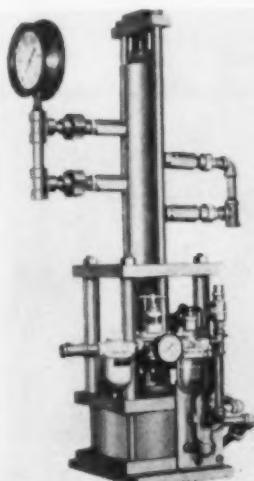
sembles the work prior to staking. The weight of the hammer blow is adjustable for the required blow for the job and the trip-dog action insures a uniform blow every time, despite slight variations in stock thickness. The machine can handle 1000 pieces an hr. Sample assemblies of riveting problems can be sent for study and recommendations to *High Speed Hammer Co., Inc.*

For more data insert No. 35 on postcard, p. 35.

Hydro-Pneumatic Pump

High pressures at small volume.

Design improvements have been made on the Aldrich-Lytle hydro-pneumatic unit. The pump is self-contained, uses normal plant air as the power medium and provides high pressures (up to 20,000 psi)



at small volume. The unit has been made more compact, lighter in weight and incorporates other refinements in design. It has reportedly proven satisfactory in testing tubing, valves and pressure vessels, in the operation of small molding presses, and in other services requiring high pressure at small volume. *The Aldrich Pump Co.*

For more data insert No. 36 on postcard, p. 35.

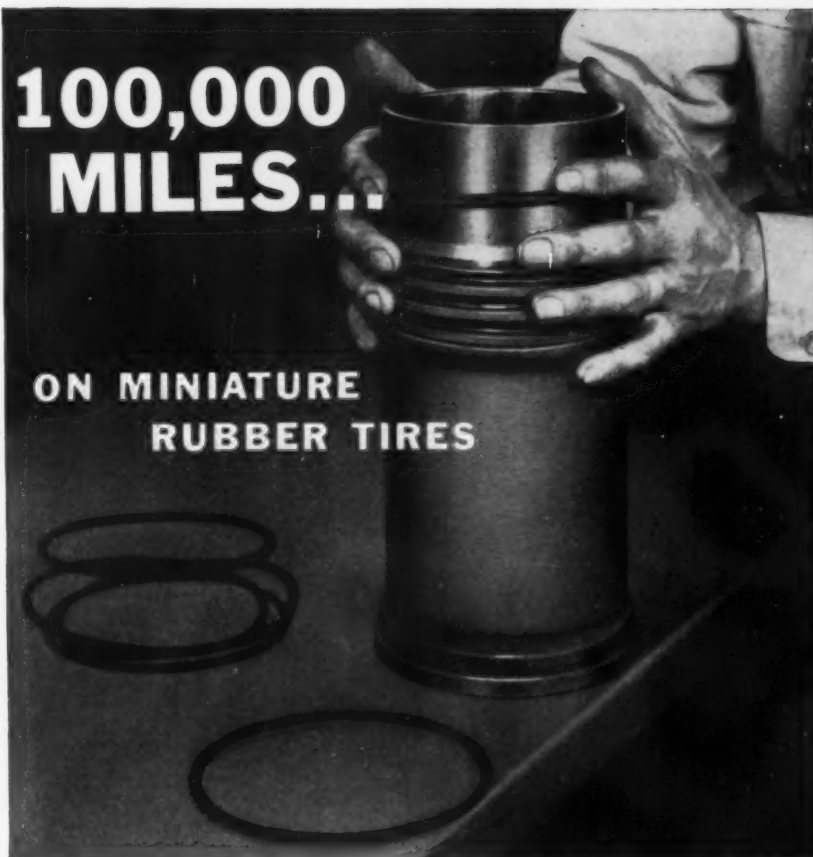
SR-4 Load Cells

For larger scale production, greater safety, higher accuracy.

Redesigned for larger scale production, a greater safety factor with overloads, and higher accuracy with off-center loads, a new U-1 Series of SR-4 universal (tension-compression) load cells have the same rugged construction as the Type U cells which are replaced as standard units. Sealed-in sensing elements consist of SR-4 resistance wire strain gages bonded to a steel column or bar and compensated for temperature variations. Female threads on both ends of the cells take tension or compression fittings. Rated load capacities are 500 to 50,000 lb. Accuracy of load measurement is within $\pm \frac{1}{4}$ pct of full range at any load within rated ca-

100,000 MILES...

ON MINIATURE RUBBER TIRES



Photograph courtesy of Cummins Engine Company, Inc., Columbus, Indiana

Tire-shaped rubber packing rings for cylinder liners in Cummins diesel engines are small but important. They provide a seal between oil and water—a seal that must be perfect whether the engine is cold or operating at high temperatures. Moreover, these rubber rings must stand up for at least the equivalent of 100,000 miles of operation.

These severe operating requirements presented a rubber problem with exacting specifications: resistance to sustained heat—controlled swell in oil—exceptional compression quality—precision tolerances.

Continental met all these specifications and produced a rubber ring that gives outstanding service in an outstanding diesel engine.

The successful production of this specialized rubber part is typical of the complete service in rubber offered by Continental.

When you need molded or extruded rubber parts, why not enlist the assistance of Continental?



LET US SEND YOU THIS CATALOG

This new engineering catalog lists hundreds of standard grommets, bushings, rings and extruded shapes. It will be a valuable addition to your working file. Send for your copy today or . . .

See our Catalog in Sweet's File for Product Designers

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CONTINENTAL

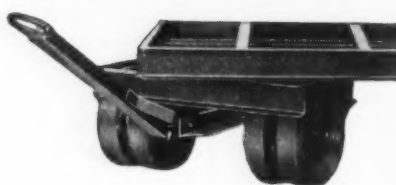
RUBBER WORKS

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up to 50 ton capacity

Built with 80 years of skill by pioneers in the industry. Over a hundred standard two, four, and fifth wheel trucks and trailers. Special units designed and built to your specification. Complete engineering service.

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production ideas

Continued

capacity. Load cells may be used with indicating, recording, or controlling instruments. Input current may be ac or dc at 4 to 8 v. *Baldwin-Lima-Hamilton Corp.*

For more data insert No. 37 on postcard, p. 35.

Measuring Machine

For precision measurements with direct optical reading to 0.00005 in.

A measuring machine for precision measurements provides direct optical reading to 0.00005 in. without the use of micrometer screws. Universal application, simple handling, and direct optical reading of measurements in gradu-



ations of 1, 0.1, 0.01, 0.001, 0.0001 and 0.00005 in. characterize this machine. Measuring range for longitudinal and transverse travel is 4x4 in. Magnifications of reading, measuring and centering microscopes are 100x, 45x and 35x respectively. *Hauser Machine Tool Corp.*

For more data insert No. 38 on postcard, p. 35.

Unloading Attachment

Converts rotary gear shaving machines for automatic unloading.

A new, low-cost, universal, self-contained attachment is especially adaptable to unloading small gears when automatic loading is employed. The attachment cuts costs by reducing operator fatigue and permits one operator to service more machines. The unloader consists of a small wire-mesh belt that travels over two drums. Drive is from a low-horsepower electric motor; slots in one mounting

*

RECOMMENDATION

Spray buffed steel parts emulsion of Oakite Comp. No. 97 in water. Rinse with fresh water at 140°

**For every
metal-cleaning
job there is
an efficient
Oakite method:**

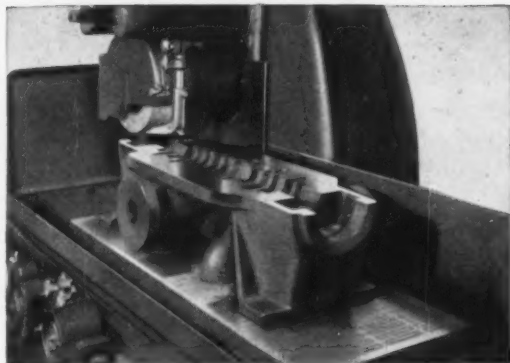
- Precleaning in tanks
- * Precleaning in machines
- Alkaline cleaning in tanks
- Alkaline cleaning in machines
- Pickling
- Barrel cleaning
- Electrocleaning
- Pre-paint treatment in machines
- Pre-paint treatment in tanks
- Steam-gun cleaning
- Paint stripping

FREE For more information about these cleaning methods, write to Oakite Products, Inc., 30H Thames St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
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TRADE MARK REG. U. S. PAT. OFF.
MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

WHERE THERE IS A FLAT SURFACE TO GRIND THERE'S A MATTISON TO GRIND IT.



40 hours before — now 4 hours. Pump case ground on Mattison Horizontal Spindle Precision Surface Grinder.



700 connecting rods per hour, using 40 station fixture to finish grind crank and wrist pin end of assembled rod with Mattison No. 72 Grinder.

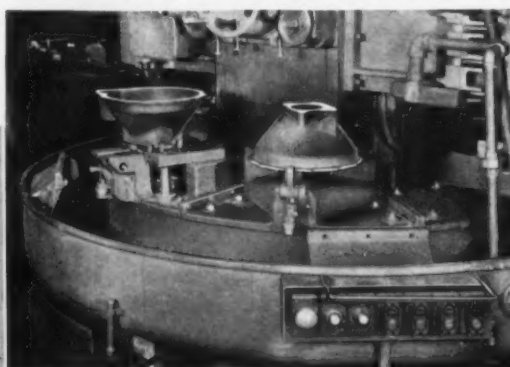
With the addition of the production grinding machinery formerly made by the Hanchett Manufacturing Company, Mattison is now in a position to work with you on all your surface, face and disc grinding problems. These machines are made in various types to handle a wide range of work. Experienced engineers are available to give you best production efficiency, finish and tolerances, with Mattison machines.

For any flat grinding ask for our recommendations on the proper method and machine for your job. No obligation, of course.

For catalogs on any of the types shown or if you would like a copy of the general bulletin, let us know and we'll gladly send them to you.



Grinding Cast-Iron Cams — 5" diameter, 1 1/2" thick — stock removal, each side .030". Production 120 surfaces per hour on Mattison (Hanchett Type) Rotary Surface Grinder.



200 Transmission Case surfaces ground per hour on Mattison (Hanchett Type) Rotary Automatic Grinder. A special 8-station mechanical fixture permits one operator to grind each end of this large 35 lb. casting, flat and parallel. Stock removal .050".



320 surfaces of cast iron compression heads per hour, removing 1/32" stock with Mattison No. 24 Rotary Surface Grinder.

MATTISON

MACHINE WORKS

ROCKFORD • ILLINOIS



cat nap's unaffected... his plant's protected

Here's real peace of mind! He knows that fire from a short circuit, a stray spark, a forgotten cigarette or spontaneous combustion can't destroy his investment in materials, equipment and buildings. His plant is protected with modern, approved C-O-TWO Fire Protection Equipment.

For instance, with a C-O-TWO Combination Smoke Detecting and Fire Extinguishing System you have a 24 hour a day automatic fire watchman. The first whiff of smoke in a protected area sounds an alarm. Then fast, clean, non-damaging, non-conducting carbon dioxide blankets the fire, putting it out in seconds, before it spreads and causes extensive damage . . . no lingering odors, no water damage with carbon dioxide.

There are areas in your plant that particularly need C-O-TWO fast, positive fire protection: record vaults, store rooms, spray booths, dip tanks, solvent baths, electrical equipment enclosures, lift trucks, pump rooms, especially anywhere there's danger of flammable liquid or electrical fires. The longer you wait to adequately protect these fire hazardous areas, the greater are the chances of a costly fire cutting into your profits.

Whatever your fire protection problem, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today . . . tell us about your particular fire hazards, our experience is at your disposal . . . no obligation of course.



C-O-TWO FIRE EQUIPMENT COMPANY

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Sales and Service in the Principal Cities of United States and Canada

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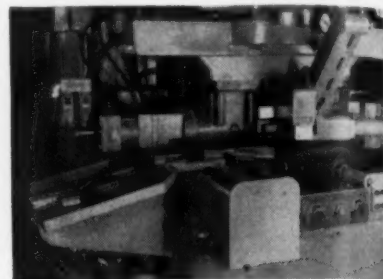
MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeeze-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
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production ideas

Continued

bracket allow adjustment to take up slack in the belt. Use of a wire-mesh belt permits cutting fluids to drain back into the machine before the gear is discharged into the col-



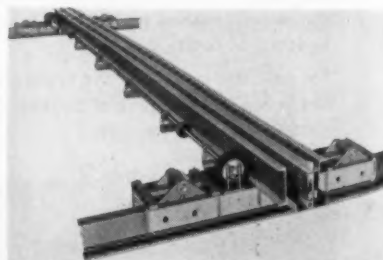
lecting pan. The unloader can be attached to any Michigan Tool 870 or 870A automatic gear finisher in several different positions. *Michigan Tool Co.*

For more data insert No. 39 on postcard, p. 35.

Constant Service Crane

Smooth travel at above-normal speeds under constant service.

Articulated trolleys carrying a new crane are designed so that each wheel bears its full share of the load in perfect alignment with the craneway tracks. Friction is eliminated by thrust bearings at all load



bearing points resulting in perfectly articulated trolley travel. Two new methods of propulsion are also available: Fluid drive using the hydraulic coupling principle and a heavy gear drive consisting of slip ring motor with heavy duty gear reducer directly connected to the drive shaft. *American MonoRail Co.*

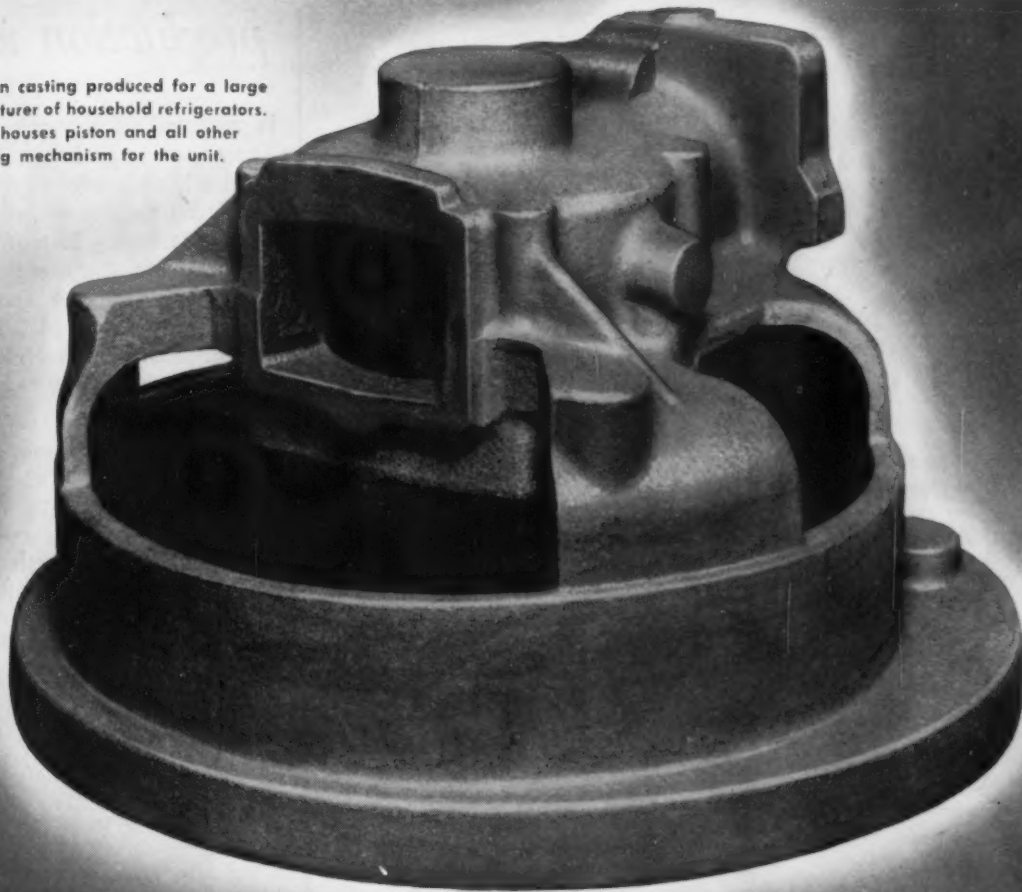
For more data insert No. 40 on postcard, p. 35.

Oscilloscope

Vertical mounting of the 5-in. cathode ray tube saves space.

Designed to save space on the testing bench, the 5-in. cathode ray tube of the Model 476 Mirroscope,

Gray Iron casting produced for a large manufacturer of household refrigerators. Casting houses piston and all other operating mechanism for the unit.



Consider all the "angles" and you'll choose **GRAY IRON**

GRAY IRON Characteristics Include:

- Castability
- Rigidity
- Low Notch Sensitivity
- Wear Resistance
- Heat Resistance
- Corrosion Resistance
- Durability
- Vibration Absorption
- Machinability
- Wide Strength Range

Note the complex design and numerous "angles" in the Gray Iron casting shown above. Then figure the cost of producing this part by fabricating or joining methods. No wonder Gray Iron's castability made it the logical and economical choice for this application.

There are other advantages, too. Gray Iron provides a dense, rigid structure, with excellent damping qualities. On operating surfaces, Gray Iron takes an excellent mirror-like finish.

Consider all the "angles"—including the advantageous characteristics listed here—and you, too, will wisely choose Gray Iron.



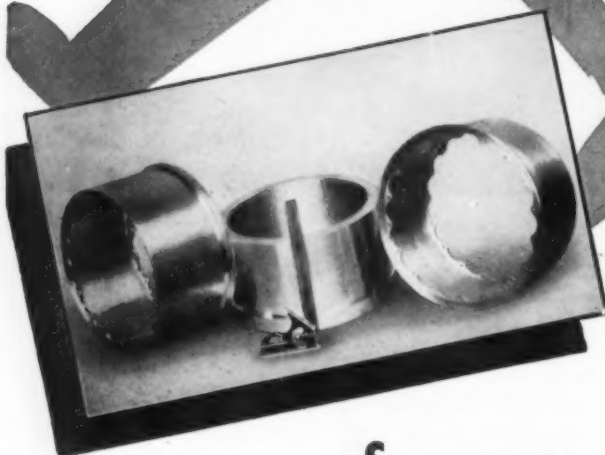
Make It Better With Gray Iron
Second largest industry in the Metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.

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Castings FOR THE JET ENGINE!



Special high alloy, of course...to meet the exceptionally high temperatures encountered in jet engine operation.

Centrifugally cast...to provide the dense grain, uniform, clean castings required by the strict specifications.

Duraloy...because of the consistent excellence of castings turned out in our modern, technically controlled foundry. And note the machining! The center casting is a rough blank, the right and left castings are finished.

Why not let our metallurgists and foundrymen take care of your high alloy casting requirements, too?

THE DURALOY COMPANY

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production ideas

Continued

is mounted in a vertical position. The cathode ray image is reflected from a high grade mirror mounted in the adjustable cover at the top of the cabinet. Mirror and wing sides at top, for deflecting light, fold into the cabinet when it is not in use. Height is 16¼ in.; width, 9½ in. *Simpson Electric Co.*

For more data insert No. 41 on postcard, p. 35.

Speed-Barrow

Perfectly balanced, requires no lifting to discharge load.

The new Speed-Barrow is said to handle easily even when fully loaded. Equipped with pneumatic tires, it is quiet and will not harm



surfaces. It is made of extra heavy gage steel throughout. Two models are available, with and without discharge gate. The gate for unloading opens by stepping on a trip bar. *American Conveyor Co.*

For more data insert No. 42 on postcard, p. 35.

Floor Resurfacer

Produces surface with resistance to wear, acids, oils, grease.

An improved type of Armor resurfacing and patching material for concrete floors contains a new, finer aggregate that is said to produce a more effective overall floor resurfacer and to fill even the most minute cracks. Armor is a dry cementitious type powder made of pulverized pure-oxidizing metal grains and four different kinds of aggregate, chemicals and puzzolanic ingredients. It is shipped as a dry powder and used by adding water and applying in much the same manner as concrete. *Monroe Co., Inc.*

For more data insert No. 43 on postcard, p. 35.

Resume Your Reading on Page 39

IRON AGE *markets and prices*

*market
briefs
and
bulletins*

beat the shortage—Sponsored by the Society of Automotive Engineers, an emergency meeting of top metallurgists last week in Detroit resulted in announcement of two series of interim alloy steels to replace some of the tight alloy steels for the next 2 or 3 months. Two series of boron-containing steels were also announced to replace the interim steels later. Samples of the boron group are now available to consumers on request.

PA's report slowup—A general levelling off in the pell-mell upward rush of procurement in industry has been noted by the National Assn. of Purchasing Agents. PA's expect a definite gap to develop between the slow-down of civilian production and the speed-up of defense production. Prices continued to creep upward during February.

tungsten carbide—The recent move by the Defense Minerals Administration putting a temporary control on distribution of tungsten concentrates highlights our general short position of tungsten. The tungsten situation is becoming increasingly difficult and widespread buying of tungsten carbide tools, will place this material high on the critical shortage list along with tungsten high speed steel.

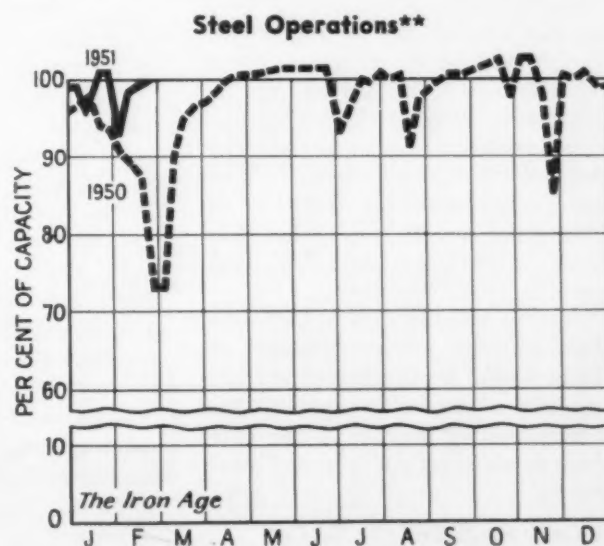
Portugal to make tubing—With the help of \$990,000 provided by the Economic Cooperation Administration under the Marshall Plan, Portugal will soon start production of welded steel tubing. At present factories making defense items and home and industrial equipment import steel tubing. The plant will have an estimated capacity of 15,000 to 16,000 tons a year. Initial production is expected to be 8000 tons per year.

Canadian cobalt—In an effort to boost production of cobalt in Ontario, the Canadian government has raised the price for cobalt. The new rates will boost government payments by about 60 pct. The price for ores and concentrates will range from \$1.35 to \$1.45 a pound for contained cobalt of 10 to 14 pct.

heat on—mercury rises—Under the heat of wartime demand, mercury prices may jump another \$50 over the already inflated f.o.b. Spanish port price of \$200. This would equal the World War II high of \$250. In spite of present high firm prices Spanish and Italian mercury is not moving freely. The higher price is expected to bring disused mines into production. Production for 1951 is expected to be about 60,000 flasks.

consumer goods—At the end of 1950 Westinghouse's backlog of unfilled orders was more than 35 pct military, reported Gwilym Price, president. He said production of consumer products, including radio and television, had been cut back 20 pct. He predicted that consumer durable goods output for the entire year would be about 74 pct above the 1935-39 average, or about 18 pct higher than the postwar year 1946.

standardization—National Production Authority is expected to order some standardization in a number of product lines. Many companies are way ahead of them on this. When materials are in short supply, it is just good sense to concentrate production on fewer models.



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Feb. 19	98.0*	101.5	99.0*	99.0	103.5	104.0	95.0*	109.0	99.0	104.0	86.0	87.2	112.6	99.5
Feb. 25	97.0	102.6	99.0	99.0	102.3	104.0	99.0	108.0	99.0	104.0	86.0	87.2	112.6	100.0

* Revised.

** Beginning Jan. 1, 1951, operations are based on an annual capacity of 104,229,850 net tons.

nonferrous metals

outlook and
market activities

NONFERROUS METALS PRICES

	Feb. 21	Feb. 22	Feb. 23	Feb. 24	Feb. 26	Feb. 27
Copper, electro, Conn....	24.50	....	24.50	24.50	24.50	24.50
Copper, Lake delivered....	24.625	....	24.625	24.625	24.625	24.625
Tin, Straits, New York....	\$1.83	....	\$1.83	....	\$1.82½	\$1.82½*
Zinc, East St. Louis	17.50	....	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	....	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

*Tentative.



by R. Hatschek

New York — The nonferrous metals scrap market is in a pretty rugged state. Competition is running high for metals, and the government's loose price control over this market is not working well. Dealers say that, if the market continues through March as it has been during the end of February, prices must go up.

At present, most copper and copper base scrap is being sold for export or conversion deals which have been okayed by the National Production Authority. Ingot makers may come into the market at higher prices if their stocks continue to diminish as they have and it is reported that their stocks are definitely "not good."

Trade sources state that the best solution for the problem at hand would be the immediate imposition of a specific price list for scrap metals, similar to the ceilings established for iron and steel scrap.

Copper Stockpiling to Be Cut

According to the Ingot Brass and Bronze Industry, shipments of secondary ingots dipped slightly again in January to a total of 28,416 tons as compared to 28,757 tons in December. Ingot consumers are seriously lacking DO rated orders to keep their plants humming.

One bright ray in the copper supply situation is that the Munitions Board is planning on cutting down its rate of stockpiling to 50 pct for an indefinite period. The metal not stockpiled will be allocated to industry where it is needed.

What the brass mills and their employees really need is more defense contracts to fill the gap between the civilian production they are permitted and full output.

The first committee for the international allocation of scarce materials was scheduled to meet this Monday. It is the committee for the control of copper, lead and zinc, one of six sponsored by the U. S., Great Britain and France. Other committees are set to control tungsten and molybdenum; manganese, nickel and cobalt; sulphur; cotton; and wool.

At press time, no details of the meeting were to be had but it was announced that the nations participating are Australia, Belgium (representing the Benelux group), Mexico, Norway, Peru, United Kingdom, and the United States.

It was also announced that the tungsten-molybdenum committee would meet on Mar. 8 and that the manganese-nickel-cobalt committee would meet on Mar. 12. Nations participating in these committees are Australia, Bolivia,

Brazil, Chile, West Germany, France, Portugal, Spain, Sweden, the U. K. and the U. S. on the former and Belgium (for Benelux), Brazil, Canada, Cuba, West Germany, France, India, Norway, Union of South Africa, the U. K. and the U. S. on the latter.

Economic Stabilization Agency price ceilings on both primary and secondary zinc are expected momentarily by industry. The orders have already been drafted but apparently legal technicalities are holding them back.

Kaiser Pays Bill

The surplus aluminum plants bought by the Kaiser Aluminum & Chemical Co. after the last war have now been paid for in full. Last week's payment of \$37,394,250 to the government was made a full 23 years ahead of schedule and raised the total government receipts for principal, interest and rental on the five Kaiser plants to \$56,313,789.

Early this week the tin situation remained in the same state of unbalance that has prevailed since shortly after the price freeze. The Singapore and London prices remained too high for imports to this country and even climbed a bit higher. In New York the price dipped to \$1.82½ per lb on Monday.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 82¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 76S-O, 76S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 76S-O, 76S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 76S-O, 76S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 76S-O, 76S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 16.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to 11.1¢; 36 to 38, 47.2¢ to 17.0¢.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ¼ to 1 1/32 in., 53.5¢ to 42¢; ¾ to 1 ½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 61S-T4, 48.5¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 76S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in., 1 ¼ to 2, 37¢ to 64¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., \$1.142; 96 in., \$1.522; 120 in., \$1.902; 144 in., \$2.284. Gage 0.024 in. x 28 in., 72 in., \$1.379; 96 in., \$1.839; 120 in., \$2.299; 144 in., \$2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FSI-O, ¼ in. 63¢; 3/16 in. 65¢; ½ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, \$1.05; 22, \$1.27; 24, \$1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1 ¼ to 1.749 in., 53¢; 2 ¼ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¼ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ in. to 6/16, \$1.40; 5/16 to ¾, \$1.26; ¾ to 1, \$0.98; 1 to 2 in., 76¢; 0.165 to 0.219, ¾ to 1, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.; Up to 1 ½ in., 10,000 lb; 1 ½ to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$6.

Nickel and Monel

(Base prices, f.o.b. mill)

"A" Nickel Monel		
Sheets, cold-rolled	71 ½	57
Strip, cold-rolled	77 ½	60
Rods and bars	67 ½	55
Angles, hot-rolled	67 ½	55
Plates	69 ½	56
Seamless tubes	100 ½	90
Shot and blocks		50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03		40.63
Copper, h-r		36.88	
Copper, drawn		38.18	
Low brass	39.15	38.84	
Yellow brass	38.28	37.97	
Red brass	40.14	39.83	
Naval brass	43.08	38.61	38.07
Leaded brass		32.63	36.70
Com'l bronze	41.13	40.82	
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	
Muntz metal	40.43	36.74	37.99
Al silver, 10 pct	49.27	51.49	
Arch. bronze			35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be.	\$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	\$69.00
Bismuth, ton lots	\$2.25
Cadmium, del'd	\$2.55
Cobalt, 97-99% (per lb)	\$2.10 to \$2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	\$216-\$220
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$90 to \$93
Silver, New York, cents per oz.	90.16
Tin, New York	\$1.82 ½
Titanium, sponge	\$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	\$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	46.25
No. 215	43.25
No. 245	36.00
Yellow ingot	
No. 405	25.00
Manganese bronze	
No. 421	29.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.25-34.25
0.60 copper, max.	33.00-34.00
Piston alloys (No. 122 type)	30.50-31.00
No. 12 alum. (No. 2 grade)	30.00-30.50
108 alloy	30.25-30.75
195 alloy	31.25-31.75
13 alloy	33.50-34.00
ASX-679	30.50-31.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97 ½ %	32.00-32.50
Grade 2—92-95 %	30.25-30.75
Grade 3—90-92 %	29.25-29.75
Grade 4—85-90 %	28.75-29.25

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39 ½
Electrodeposited	33 ½
Rolled, oval, straight, delivered	38 ½
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34 ½
Zinc, oval	26 ½
Ball anodes	25 ½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	\$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79 ½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20 ½
Nickel chloride, 375 lb drum	27 ½
Silver cyanide, 100 oz lots, per oz.	67 ½
Sodium cyanide, 95 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turn-ings
Copper	23	22 ½
Yellow Brass	20 ½	18 ½
Red brass	21 ½	20 ½
Comm. bronze	21 ½	21
Mang. bronze	19 ½	18 ½
Brass rod ends	19 ½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.50
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	19.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	23.00
No. 2 copper wire	22.00
Light copper	21.00
No. 1 composition	22.00
No. 1 comp. turnings	21.50
Rolled brass	18.50
Brass pipe	20.50
Radiators	17.50
Heavy yellow brass	17.00

Aluminum	
Mixed old cast	18 ½—19
Mixed new clips	20 ½
Mixed turnings, dry	18 ½
Pots and pans	18 ½—19
Low copper	21 ½—22

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	21 ½
No. 2 heavy copper and wire	20
Light copper	19
New type shell cuttings	19
Auto radiators (unsweated)	15 ½—16
No. 1 composition	19—19 ½
No. 1 composition turnings	18 ½—19
Clean red car boxes	17 ½—18
Cocks and faucets	17 ½—18
Mixed heavy yellow brass	14 ½—15
Old rolled brass	15 ½—16
Brass pipe	18 ½—19
New soft brass clippings	17 ½—18
Brass rod ends	16 ½—17
No. 1 brass rod turnings	16—16 ½

Aluminum	
Alum. pistons and struts	12—13
Aluminum crankcases	15—16
2S aluminum clippings	18 ½—19 ½
Old sheet and utensils	15—16
Borings and turnings	12 ½—13
Misc. cast aluminum	15—16
Dural clips (24S)	15—16

Zinc	
New zinc clippings	14 ½—15
Old zinc	11—11 ½
Zinc routings	8 ½—9
Old die cast scrap	8—8 ½

Nickel and Monel

Pure nickel clippings	90—100
Clean nickel turnings	80—90
Nickel anodes	90—100
Nickel rod ends	90—100
New Monel clippings	30—35
Clean Monel turnings	20—25
Old sheet Monel	25—30
Inconel clippings	30—35
Nickel silver clippings, mixed	16—18
Nickel silver turnings, mixed	15—16

Lead

Soft scrap, lead	15—15 ½
Battery plates (dry)	8 ½—9

Magnesium

Segregated solids	9—10
Castings	5 ½—6 ½

Miscellaneous

Block tin	120—125
No. 1 pewter	80—85
No. 1 auto babbitt	75—80
Mixed common babbitt	12 ½—12 ¾
Solder joints	23—24
Siphon tops	75—80
Small foundry type	18 ½—18 ¾
Monotype	16 ½—17
Lino. and stereotype	16 ½—16 ¾
Electrotype	15—15 ½
Hand picked type shells	11 ½—11 ¾
Lino. and stereo. dross	8 ½—9
Electro. dross	6 ½—7

SCRAP *iron and steel*

*markets
prices
trends*

Scrap stays sluggish . . . Washington clarification awaited . . . Openhearth users banned from use of grades Nos. 20 and 21.

The scrap market has been bled of its usual virility by ambiguities, inequities in the pricing order, possible misinterpretations that the trade is unwilling to risk. Functioning best in an environment of unrestricted trading, it is now in a temporary period of maladjustment that arose when it was fitted into a mold. Most recognize the emergency and will admit that it had to be done. Recommendations from the Scrap Institute will help Washington clear the confusion so that dealers, brokers, and consumers can get down to the business of helping rearm America.

Although the market was sluggish in almost all centers, some indicated that scrap was moving a little better. Openhearth consumers, who were previously cut off from scrap grades Nos. 11 through 18, were told by NPA that they could no longer use foundry grades Nos. 20 and 21. Stocks of some foundries have been flattened.

Reports were circulating that scrap stocks of some mills were down to bedrock. Allocations were increasing. It was indicated in Pittsburgh that exclusive broker-consumer contracts would be dropped. A shortage of scrap was developing in Chicago but was not expected to become critical.

PITTSBURGH—Exclusive broker-consumer contracts are out the window for the duration of controls. With allocations growing in volume, it is virtually impossible for one supplier to fully accommodate an exclusive account. For one thing it was pointed out that a scrap generator whose material is allo-

cated to a mill can designate the broker he wants to handle the deal. Openhearth mills were notified last week by Marvin Plant, Chief of the Scrap Section, Iron & Steel Div., NPA, that they can no longer accept foundry grades 20 and 21 for openhearth use. This ruling had been expected. Meanwhile, scrap movements were accelerating, but the market continued relatively quiet.

CHICAGO—Activity in the Chicago scrap market continues at a minimum this week. An overall scrap shortage is developing but is not expected to become critical. Hardest hit are foundries whose inventories are low because of the high rate of production and the fact that they held off buying at high prices before ceilings were put on. Scattered instances are reported where foundries have paid \$20 to \$23 per ton in freight to bring in cast grades from remote areas. Since dealers concentrated on shipping the highest priced scrap, such as cast, before the price deadline, No. 1 and No. 2 heavy melting and bundles are the most plentiful although still short.

PHILADELPHIA—Western mills' buying of grades No. 20 and 21 was short-lived. Washington took those two foundry grades out of reach of openhearth consumers. Mill inventories were not any higher this week and some had dropped. The scrap movement was still slow but gaining a shade of momentum. Revisions of the scrap order are expected to get the ball rolling again.

NEW YORK—Brokers here feel the slow scrap market will revive when Washington unsnarls the pricing order. Many believe its ambiguities, and fear of misinterpreting it, act as a narcotic on scrap movement. Recommendations from the Scrap Institute stemming from the Chicago meeting may do the trick. Meanwhile scrap is tight and mill stocks are dropping, with some at bedrock level. Claims and counter-claims are flying around on the \$1.25 lighterage charge on Brooklyn to Jersey shipments.

DETROIT—Without official clarification from Washington, a base price of \$40.20 has been adopted in Detroit to eliminate the advantage of water shippers who were not required to pay a Detroit switch. Official recognition of this situa-

tion is expected soon. Meanwhile, dealer shipments are reported to be light. Persistent reports of sales of small bales as electric furnace material points to an early clarification of this point. Present indications are that dealers are reluctant to part with cast at formula.

CLEVELAND—Relatively little tonnage was moving here or in the Valley this week except plant scrap. Consumers' inventories are being rapidly depleted and the trade is hoping better weather and possible amendments to some of the "unworkable" specifications of the OPS order, particularly on electric furnace grades, will start the market moving again. Foundries are hard hit.

ST. LOUIS—Movement of scrap has been slowed considerably by rain and low temperature. An improvement is expected this week. Receipts are not keeping pace with mill consumption and material is needed. Railroads are beginning to ship scrap under the allocation plan tied in with the scrap order.

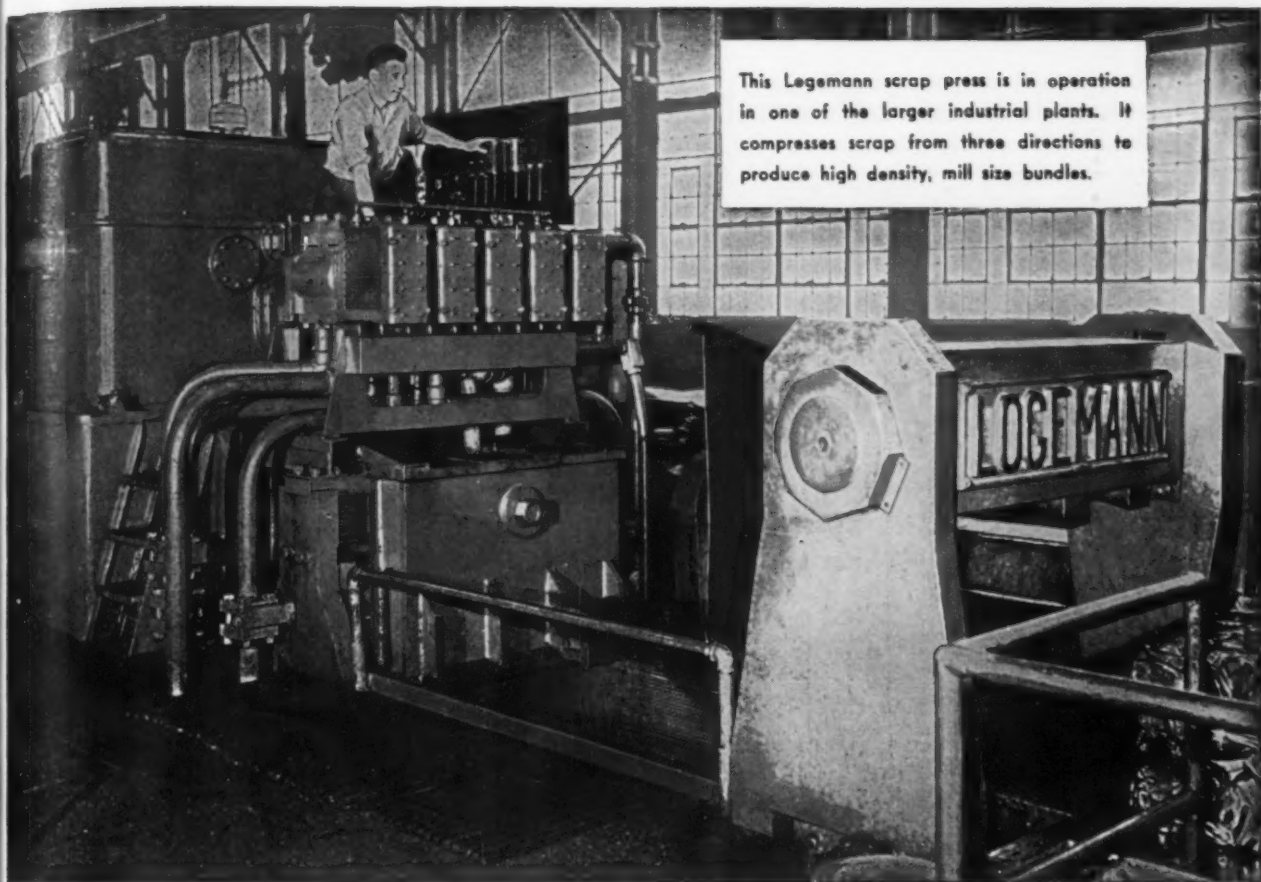
BIRMINGHAM—Apparently realizing that a large proportion of the scrap in the Southeast is moving north, users in this district this week were buying everything they could get, but at best most of them have only a limited supply on hand. Foundry steel also is in demand.

CINCINNATI—Demand is strong, but supply is weak. At least one major consumer is believed to have no more than a week's inventory. Scrap is moving but in small tonnages. Dealers and brokers are selling slowly and the bulk of the tonnage that is moving is plant scrap. Foundries are hunting for cast.

BOSTON—Conditions in the local scrap market remained unchanged during the past week. With the exception of unstripped motor blocks there is general approval of the scrap order and scrap is moving normally. Dealers say unstripped motor blocks can be bought cheaper in all other areas.

BUFFALO—Leading consumers are pressing for scrap as supply takes on more serious aspects. One of the three top mills has been hitting its reserves hard. Dealers report yard stocks at a minimum. Cast is especially tight. Dealers are hoping for a price revision on unprepared scrap.

This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.



Self-Contained . . . Triple Compression . . . Automatically Controlled } **LOGEMANN** **SCRAP PRESSES**

handle high tonnages with minimum labor . . . at low cost

LOGEMANN METAL BALERS

. . . are built in a large range of sizes to meet specific conditions. Let Logemann's engineering service help you arrive at the most efficient and economical way of handling your scrap.

The compact unit illustrated is completely self-contained with oil tank and pump located directly over the press . . . utilizing the advantages of short pipe lines. Automatic controls, mounted in front of pump, give the operator full visibility at all times. Controls operate rams successively within a single rigid box. There is no complex construction which means there is *no need for specially-trained maintenance crews.*

Both two-ram and three-ram models are available with automatic controls or for manual manipulation.

Logemann Bros. Co. have specialized in the production of scrap metal presses for sheet mills, stamping plants, scrap yards, and metal manufacturing plants of all types for nearly 75 years. Write for full information — please state the nature of your scrap and tonnage.

LOGEMANN BROTHERS COMPANY
3164 W. Burleigh Street Milwaukee 10, Wisconsin

Iron and Steel SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

GRADES	OPS No.	Basing Points															
		Pittsburgh	Joliet	Brackenridge	Millard	Muskegon	Sharon	Youngstown	Canton	Warren	Cleveland	Cincinnati	Chicago	Claymont	Cottleville	Harborside	Phoenicia
No. 1 heavy melting	1	\$44.00	\$44.00	\$43.00	\$42.50	\$42.00	\$41.00	\$40.00	\$39.50	\$39.00	\$38.00	\$37.00	\$36.00	\$35.00	\$34.00	\$33.00	\$32.00
No. 2 heavy melting	2	42.00	42.00	41.00	40.50	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00	29.00
No. 1 busheling	3	44.00	44.00	43.00	42.50	42.00	41.00	40.00	39.50	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00
No. 1 bundles	4	44.00	44.00	43.00	42.50	42.00	41.00	40.00	39.50	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00
No. 2 bundles	5	41.00	41.00	40.00	39.50	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00	29.00	28.00
Machine shop turnings	6	34.00	34.00	33.00	32.50	32.00	31.00	30.00	29.50	29.00	28.00	27.00	26.00	25.00	24.00	23.00	22.00
Mixed borings and turnings	7	38.00	38.00	37.00	36.50	36.00	35.00	34.00	33.50	33.00	32.00	31.00	30.00	29.00	28.00	27.00	26.00
Shovelling turnings	8	38.00	38.00	37.00	36.50	36.00	35.00	34.00	33.50	33.00	32.00	31.00	30.00	29.00	28.00	27.00	26.00
Cast iron borings	10	38.00	38.00	37.00	36.50	36.00	35.00	34.00	33.50	33.00	32.00	31.00	30.00	29.00	28.00	27.00	26.00
No. 1 chemical borings	26	41.00	41.00	40.00	39.50	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00	29.00	28.00
Forge crops	11	51.50	51.50	50.50	50.00	49.50	48.50	47.50	46.50	45.50	44.50	43.50	42.50	41.50	40.50	39.50	38.50
Bar crops and plate	12	49.00	49.00	48.00	47.50	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00
Punchings and plate	14	46.50	46.50	45.50	45.00	44.50	43.50	42.50	41.50	40.50	39.50	38.50	37.50	36.50	35.50	34.50	33.50
Electric furnace bundles	15	46.00	46.00	45.00	44.50	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00
Cut struct., plate, 3 ft and less	16	47.00	47.00	46.00	45.50	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00
Cut struct., plate, 2 ft and less	17	49.00	49.00	48.00	47.50	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00
Cut struct., plate, 1 ft and less	18	50.00	50.00	49.00	48.50	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00
Heavy turnings	24	43.00	43.00	42.00	41.50	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00	32.00	31.00	30.00
No. 1 RR heavy melting	RR 1	46.00	46.00	45.00	44.50	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00	34.00	33.00
Scrap rails, random lengths	RR 14	48.00	48.00	47.00	46.50	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00
Scrap rails, 3 ft and less	RR 16	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00
Scrap rails, 2 ft and less	RR 17	52.00	52.00	51.00	50.50	50.00	49.00	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00
Scrap rails, 18 in. and less	RR 18	54.00	54.00	53.00	52.50	52.00	51.00	50.00	49.00	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00
Re-rolling rails	RR 15	53.00	53.00	52.00	51.50	51.00	50.00	49.00	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00
Uncut tires	RR 20	48.00	48.00	47.00	46.50	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00	35.00
Cut tires	RR 21	49.00	49.00	48.00	47.50	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00	37.00	36.00
Cut bolsters and side frames	RR 22, 23	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00
RR specialties	RR 24, 25, 26	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00
Solid steel axles	RR 25	58.00	58.00	57.00	56.50	56.00	55.00	54.00	53.00	52.00	51.00	50.00	49.00	48.00	47.00	46.00	45.00
No. 3 steel wheels	RR 27	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.00	45.00	44.00	43.00	42.00	41.00	40.00	39.00	38.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	Price
Cupola cast	1	\$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y, cast	11	52.00

Boston, unstripped motor blocks...\$38 to \$39

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall, Cincinnati; Newport, St. Louis; Granite City, East St. Louis, Madison, San Francisco; South San Francisco, Niles, Oakland, Claymont; Chester, Chicago; Gary, Los Angeles; Firestone.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is \$1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, \$1.50, and New England ports, \$1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is \$36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below \$32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

DELIVERED PRICES (RR scrap)—Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

UNPREPARED SCRAP—Ceiling price is \$8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is \$6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, \$8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of \$1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel; \$1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. Molybdenum; \$2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, \$3 for content over 0.65 pct. Manganese; \$4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., \$14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. Silicon; electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. Chromium; \$1 may be added if scrap conforms to SAE 52100 analysis and is to be used in an electric furnace. In no case is price to exceed No. 1 heavy by more than \$1. Multiple Alloys; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special

grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron, re-rolling rails, cupola cast, clean auto cast, and malleable. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18 and foundry grades, Nos. 20 and 21.

CEILING DELIVERED PRICES FOR TRUCK SHIPMENT OF ALL STEEL OR CAST IRON SCRAP—If delivery is made by truck public carrier, ceiling delivered price shall be the ceiling shipping point price (or in the case of railroad scrap, the pertinent ceiling on-line price) plus the actual public carrier charge. Scrap delivered by shipper or broker trucks shall have a ceiling delivered price consisting of the ceiling shipping point price (or railroad ceiling on-line price) plus the established rail carload freight rate for shipping scrap from the rail siding nearest the point of delivery. Transportation charges for delivery in a shipper or broker truck shall not exceed \$4 and need not fall below \$2.50.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles.	\$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap.	6.00
Crushing machine shop turnings.	2.00
Bar crops and plate; punchings and plate; structural and plate, 1 ft & less, and 3 ft and less; foundry steel, 1 ft & less and 2 ft & less; wrought iron.	10.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames.	4.00
Rails, 2 ft & less.	5.00
Rails, 18 in. & less.	7.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889



Berman



Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
(cents per pound)	1951	1951	1951	1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00

Tin and Terneplate:

(dollars per base box)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Tinplate (1.50 lb) cokes	\$7.50	\$7.50	\$7.50	\$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50

Bars and Shapes:

(cents per pound)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	*4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50

Wire:

(cents per pound)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Bright wire	4.85	4.85	4.85	4.50

Rails:

(dollars per 100 lb)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Heavy rails	\$3.60	\$3.60	\$3.60	\$3.40
Light rails	4.00	4.00	4.00	3.75

Semifinished Steel:

(dollars per net ton)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Rerolling billets	\$56.00	\$56.00	\$56.00	\$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00

Wire Rod and Skelp:

(cents per pound)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron:	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
(per gross ton)	1951	1951	1951	1950
No. 2 foundry, del'd Phila.	\$57.77	\$57.77	\$57.77	\$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese†	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

†Average of U. S. prices quoted on Ferroalloy page.

Scrap:

(per gross ton)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Heavy melt'g steel, P'gh.	\$44.00*	\$44.00*	\$51.13	\$30.75
Heavy melt'g steel, Phila.	42.50*	42.50*	47.50	23.00
Heavy melt'g steel, Ch'go	42.50*	42.50*	44.63	27.50
No. 1 hy. com. sh't, Det.	40.00*	40.00*	40.25	22.50
Low phos. Young'n	46.50*	46.50*	54.50	32.75
No. 1 cast, Pittsburgh	49.00†	49.00†	67.75	37.50
No. 1 cast, Philadelphia	49.00†	49.00†	62.50	35.50
No. 1 cast, Chicago	49.00†	49.00†	63.00	39.50

*Basing Pt. †Shipping Pt.

Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville:

(per net ton at oven)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Furnace coke, prompt	\$14.25	\$14.25	\$14.25	\$14.00
Foundry coke, prompt	17.25	17.25	17.25	15.75

Nonferrous Metals:

(cents per pound to large buyers)	Feb. 27, 1951	Feb. 20, 1951	Jan. 30, 1951	Feb. 28, 1950
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin, Straits, New York	\$1.82%†	\$1.83	\$1.83	74.50
Zinc, East St. Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	53.55	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	27.25

†Tentative. *Revised.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

Composite Prices

Finished Steel Base Price

Feb. 27, 1951	4.131¢ per lb.
One week ago	4.131¢ per lb.
One month ago	4.131¢ per lb.
One year ago	3.837¢ per lb.

	High	Low
1951....	4.131¢ Jan. 2	4.131¢ Jan. 2
1950....	4.131¢ Dec. 1	3.837¢ Jan. 3
1949....	3.837¢ Dec. 27	3.3705¢ May 3
1948....	3.721¢ July 27	3.193¢ Jan. 1
1947....	3.193¢ July 29	2.848¢ Jan. 1
1946....	2.848¢ Dec. 31	2.464¢ Jan. 1
1945....	2.464¢ May 29	2.396¢ Jan. 1
1944....	2.396¢	2.396¢
1943....	2.396¢	2.396¢
1942....	2.396¢	2.396¢
1941....	2.396¢	2.396¢
1940....	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939....	2.35367¢ Jan. 3	2.26689¢ May 16
1938....	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937....	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936....	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935....	1.89196¢ July 5	1.83910¢ Mar. 1
1929....	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Pig Iron

.....	\$52.69 per gross ton....
.....	52.69 per gross ton....
.....	52.69 per gross ton....
.....	46.38 per gross ton....

	High	Low
.....	\$52.69 Jan. 2	\$52.69 Jan. 2
.....	52.69 Dec. 12	45.88 Jan. 3
.....	46.87 Jan. 18	45.88 Sept. 6
.....	46.91 Oct. 12	39.58 Jan. 6
.....	37.98 Dec. 30	30.14 Jan. 7
.....	30.14 Dec. 10	25.37 Jan. 1
.....	25.37 Oct. 23	23.61 Jan. 2
.....	\$23.61	\$23.61
.....	23.61	23.61
.....	23.61	23.61
.....	\$23.61 Mar. 20	\$23.45 Jan. 2
.....	23.45 Dec. 23	22.61 Jan. 2
.....	22.61 Sept. 19	20.61 Sept. 12
.....	23.25 June 21	19.61 July 6
.....	32.25 Mar. 9	20.25 Feb. 16
.....	19.74 Nov. 24	18.73 Aug. 11
.....	14.81 Jan. 5	13.56 Dec. 6
.....	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel

.....	\$43.00 per gross ton....
.....	43.00 per gross ton....
.....	47.75 per gross ton....
.....	27.08 per gross ton....

	High	Low
.....	\$47.75 Jan. 30	\$43.00 Feb. 7
.....	45.13 Dec. 19	26.25 Jan. 3
.....	43.00 Jan. 4	19.33 June 23
.....	43.16 July 27	39.75 Mar. 9
.....	42.58 Oct. 28	29.50 May 20
.....	31.17 Dec. 24	19.17 Jan. 1
.....	19.17 Jan. 2	18.92 May 22
.....	19.17 Jan. 11	15.76 Oct. 24
.....	\$19.17	\$19.17
.....	19.17	19.17
.....	\$22.00 Jan. 7	\$19.17 Apr. 10
.....	21.83 Dec. 30	16.04 Apr. 9
.....	22.50 Oct. 3	14.08 May 16
.....	15.00 Nov. 22	11.00 June 7
.....	21.92 Mar. 30	12.67 June 9
.....	17.75 Dec. 21	12.67 June 8
.....	8.50 Jan. 12	6.43 July 5
.....	17.58 Jan. 29	14.08 Dec. 8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

*Can you match
these production
figures?*

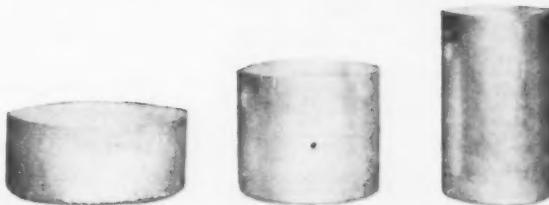
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Version

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THREE OPERATION
DRAWING
PRESS
produces
over 1200 shells
per hour**

Typical of how Verson presses are advancing the efficiency of press forming of metals is the automatic two stage three operation drawing press illustrated above. 4½" I.D. x 7¼" deep shells are drawn at the rate of 1200 per hour! A completed shell is discharged at each stroke.

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At the right is the finished shell after the final drawing and setting operation. Drawn from 21 ga. stock, the dimensions are 4½" I.D. x 7¼" deep.

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March 1, 1951

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IRON AGE STEEL PRICES	Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page. Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply													
	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middle- town	Youngs- town	Bethle- hem	Buffalo	Conscho- hocken	Johns- town	Spar- rows Point	Granite City	Detroit
INGOTS														
Carbon forging, net ton	\$52.00 ¹													
Alloy, net ton	\$54.00 ¹⁻¹⁷													\$54.00 ¹
BILLETS, BLOOMS, SLABS														
Carbon, rerolling, net ton	\$56.00 ¹⁻⁵	\$56.00 ¹	\$56.00 ¹						\$56.00 ³		\$56.00 ³			
Carbon forging billets, net ton	\$66.00 ¹⁻⁵	\$66.00 ¹⁻⁴	\$66.00 ¹	\$66.00 ⁴	\$66.00 ⁴				\$66.00 ³⁻⁴	\$73.00 ²⁻⁶	\$66.00 ³			\$66.00 ¹
Alloy, net ton	\$70.00 ¹⁻¹⁷⁻⁶	\$70.00 ¹⁻⁴⁻⁶	\$70.00 ¹		\$70.00 ⁴				\$70.00 ³⁻⁴	\$77.00 ²⁻⁶	\$70.00 ³			\$73.00 ¹
PIPE SKELP	3.35 ¹ 3.45 ⁵						3.35 ¹⁻⁴							
WIRE RODS	4.10 ² 4.30 ¹⁻⁶	4.10 ²⁻⁴⁻³³	4.10 ⁶	4.10 ²			4.10 ⁶		4.10 ⁶⁻³		4.10 ³	4.20 ³		
SHEETS														
Hot-rolled (18 ga. & hvr.)	3.60 ¹⁻⁵⁻⁹⁻¹⁵ 3.75 ²⁻⁸	3.60 ²⁻²³	3.60 ¹⁻⁶⁻⁸	3.60 ⁴⁻⁵		3.60 ⁷	3.60 ¹⁻⁴⁻⁶ 4.00 ¹⁻³		3.80 ³	4.00 ²⁻⁶		3.60 ³	4.30 ²⁻²	3.80 ¹⁻² 4.40 ¹⁻⁷
Cold-rolled	4.35 ¹⁻⁵⁻⁹⁻¹⁵ 5.35 ⁶⁻³⁻⁷		4.35 ¹⁻⁶⁻⁸	4.35 ⁴⁻⁵		4.35 ⁷	4.35 ⁴⁻⁶		4.35 ³			4.35 ³	5.05 ²⁻²	4.55 ¹⁻³
Galvanized (10 gage)	4.80 ¹⁻⁹⁻¹⁵		4.80 ¹⁻⁸		4.80 ⁴	4.80 ⁷	5.50 ⁴⁻⁶ 6.00 ⁴					4.80 ³	5.50 ²⁻²	
Enameling (12 gage)	4.65 ¹		4.65 ¹⁻⁸	4.65 ⁴		4.65 ⁷	4.65 ⁶						5.35 ²⁻²	
Long tees (10 gage)	5.20 ⁹⁻¹⁵		5.20 ¹			5.20 ⁷	6.00 ⁴⁻⁶							
Hi str. low alloy, h.r.	5.40 ¹⁻⁵ 5.75 ⁹	5.40 ¹	5.40 ¹⁻⁸ 5.90 ⁶	5.40 ⁴⁻⁵			5.40 ¹⁻⁴⁻⁶ 5.90 ⁶		5.40 ³	5.65 ²⁻⁶		5.40 ³		5.95 ¹⁻²
Hi str. low alloy, c.r.	6.55 ¹⁻⁵ 6.90 ⁶		6.55 ¹⁻⁸ 7.05 ⁶	6.55 ⁴⁻⁵			6.55 ⁴⁻⁶ 7.05 ⁶		6.55 ³			6.55 ³		7.10 ¹⁻³
Hi str. low alloy, galv.	7.20 ¹											6.75 ³		
STRIP														
Hot-rolled	3.60 ⁶ , 4.00 ⁴⁻¹¹ 3.75 ²⁻⁸ 3.80 ⁹⁻¹⁷	3.50 ⁶⁻⁶	3.50 ¹⁻⁶⁻⁸			3.50 ⁷	3.50 ¹⁻⁴⁻⁶ 4.00 ¹⁻³		3.50 ³⁻⁴	3.90 ²⁻⁶	3.50 ³	3.50 ³		4.40 ¹⁻⁷ 3.80 ¹⁻³
Cold-rolled	4.65 ⁵⁻⁷⁻⁹ 5.00 ²⁻⁸ 5.35 ¹⁰⁻⁶⁻³⁻⁵⁸	4.90 ⁶⁻⁶⁻⁶	4.90 ⁶	4.65 ²⁻⁵		4.65 ⁷	4.65 ⁴⁻⁶ 5.25 ¹⁶⁻¹⁹ 5.35 ¹⁻³⁻⁴⁰		4.65 ³			4.65 ³		4.85 ¹⁻³ 5.45 ¹⁻⁷ 5.60 ⁴⁻⁴¹
Hi str. low alloy, h.r.	5.75 ⁹		5.50 ¹ 5.30 ⁸ , 5.80 ⁶				4.95 ⁴ , 5.50 ¹⁻³ 5.40 ¹⁻³ , 5.80 ⁶ (6.20 ⁴ , 6.55 ¹⁻³ 7.05 ⁶)		4.95 ³	5.55 ²⁻⁶		4.95 ³		5.95 ¹⁻²
Hi str. low alloy, c.r.	7.20 ⁹			(6.55 ² 6.70 ⁵)					6.40 ³			6.40 ³		
TINPLATE														
Cokes, 1.25-lb base box (1.50 lb. add 25¢)	\$8.45 ¹⁻⁵⁻⁹⁻¹⁵		\$8.45 ¹⁻⁶⁻⁸				\$8.45 ⁴					\$8.55 ³		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb. base box, \$7.15 ¹⁻⁴⁻⁵⁻⁸⁻⁹ ; \$7.25 ³⁻¹¹ ; \$7.35 ²⁻² 0.50 lb., add 25¢; 0.75 lb. add 65¢													
BLACKPLATE, 29 gage	5.85 ¹ 6.15 ¹⁻⁵ 6.25 ⁵		5.85 ¹				5.30 ⁴							
Hollowware enameling														
BARS														
Carbon steel	3.70 ¹⁻⁵ 3.85 ⁹	3.70 ¹⁻⁴⁻²³	3.70 ¹⁻⁴⁻⁶⁻⁸	3.70 ⁴	3.70 ⁴		3.70 ¹⁻⁴⁻⁶		3.70 ³⁻⁴		3.70 ³			3.85 ¹
Reinforcing	3.70 ¹⁻⁸	3.70 ⁴	3.70 ¹⁻⁶⁻⁸	3.70 ⁴			3.70 ¹⁻⁴⁻⁶		3.70 ³⁻⁴		3.70 ³	3.70 ³		
Cold-finished	4.55 ²⁻⁴⁻⁵ 5.2-69-71	4.55 ²⁻⁶⁹⁻⁷⁰ 5.3-73	4.55 ⁴⁻⁷⁻⁴ 7.3	4.55 ²	4.55 ⁴⁻⁸⁻²		4.55 ⁶⁻⁸⁻⁷		4.60 ⁷⁻⁰					4.70 ⁶⁻⁴
Alloy, hot-rolled	4.30 ¹⁻¹⁷	4.30 ¹⁻⁴⁻²³	4.30 ¹⁻⁶⁻⁸		4.30 ⁴		4.30 ¹⁻⁶	4.30 ⁸	4.30 ³⁻⁴		4.30 ³			4.45 ¹⁻¹ 4.65 ¹⁻³
Alloy, cold-drawn	5.40 ¹⁻⁷⁻⁵² 6.9-71-2	5.40 ⁴⁻²³⁻⁸⁹ 70-73 5.45 ²	5.40 ⁴⁻⁷³ 7.4		5.40 ⁴⁻⁸⁻² 3.3		5.40 ⁶⁻²⁵⁻⁵⁷	5.40 ³	5.40 ³					5.55 ⁴⁻⁴
Hi str. low alloy, h.r.	5.55 ¹⁻⁵		5.55 ¹⁻⁸ 6.05 ⁶	5.55 ⁴⁻⁵			5.55 ¹⁻⁶ 6.05 ⁶	5.55 ³	5.55 ³		5.55 ³			
PLATE														
Carbon steel	3.70 ¹⁻⁵⁻¹⁵ 4.00 ⁶	3.70 ¹⁻²³	3.70 ¹⁻⁶⁻⁸	3.70 ⁴⁻⁵ 4.09 ⁹⁻⁵			3.70 ¹⁻⁴⁻⁶ 3.95 ¹⁻³		3.70 ³	4.15 ²⁻⁶	3.70 ³	3.70 ³	4.40 ²⁻²	
Floor plates	4.75 ¹	4.75 ¹	4.75 ⁶	4.75 ⁵						4.75 ²⁻⁶				
Alloy	4.75 ¹	4.75 ¹	4.75 ¹				5.20 ¹⁻³			5.05 ²⁻⁶	4.75 ³	4.75 ²		
Hi str. low alloy	5.65 ¹⁻⁵	5.65 ¹ 6.00 ⁶	5.65 ¹⁻⁸ 6.15 ⁶	5.65 ⁴⁻⁵			5.65 ⁴ 5.70 ¹⁻³ 6.15 ⁶			5.90 ²⁻⁶	5.65 ³	5.65 ²		
SHAPES, Structural														
Hi str. low alloy	5.50 ¹⁻⁵	5.50 ¹	5.50 ¹⁻⁸ 6.00 ⁶				6.00 ⁶	5.50 ³	5.50 ³		5.50 ³			
MANUFACTURERS' WIRE														
Bright	4.85 ²⁻⁵ 5.10 ¹⁻⁸	4.85 ² 4.23-33-34		4.85 ²			4.85 ⁶	Kokomo = 4.95 ²⁻⁰ 4.85 ²⁻⁵			4.85 ³	4.95 ³	Duluth = 4.85 ²	
PILING, Steel Sheet	4.45 ¹	4.45 ¹	4.45 ²						4.45 ²					

Smaller numbers indicate producing companies. See key at right.
Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana	
			F = \$79.00 ¹⁹	
	\$62.00 ²³		F = \$80.00 ¹⁹	
		\$56.00 ¹¹	F = \$75.00 ¹⁹	
	\$74.00 ²³	\$66.00 ¹¹	F = \$85.00 ¹⁹ SF, LA, S = \$85.00 ²²	Geneva = \$86.00 ¹⁶
	\$78.00 ²³		F = \$89.00 ¹⁹ LA = \$90.00 ²²	
	4.50 ²³	4.10 ^{4.11}	SF = 4.90 ² , F = 4.90 ¹⁰ LA = 4.90 ^{24.23}	{ Worcester = 4.40 ² Minnequa = 4.35 ¹⁴ Portsmouth = 4.30 ²⁰
		3.60 ^{4.11}	SF, LA = 4.30 ²⁴ F = 4.55 ¹⁹	Niles = 5.25 ²⁴ , Geneva = 3.70 ¹⁸ Ashland = 3.60 ⁷
		4.35 ¹¹	SF = 5.30 ²⁴ F = 5.30 ¹⁹	
		4.80 ^{4.11}	SF, LA = 5.55 ²⁴	Ashland = 4.90 ⁷ Kokomo = 5.20 ¹⁰
				Ashland = 4.65 ⁷
		5.40 ¹¹	F = 6.35 ¹⁹	
			F = 7.50 ¹⁰	
	4.10 ²³	4.90 ²³	SF, LA = 4.25 ^{24.23} F = 4.75 ¹⁹ , S = 4.50 ²³	Atlanta = 4.05 ²⁵ Minnequa = 4.55 ¹⁴ Ashland = 3.50 ⁷
			F = 6.30 ¹⁹ LA = 6.40 ²⁷	New Haven = 5.15 ² , 5.85 ²⁸ Trenton = 6.00 ¹⁵
		5.30 ¹¹	{ F = 6.20 ¹⁹ SF, LA = 6.05 ²³ S = 6.30 ²	
			F = 6.95 ¹⁹	
			SF = 9.20 ²⁴	
		6.35 ¹¹		
	4.30 ²³	4.10 ²³	SF, LA = 4.40 ²⁴	Atlanta = 4.25 ²⁵ Minnequa = 4.15 ¹⁴
	4.30 ²³	4.10 ²³	SF, S = 4.45 ²³ (F = 4.40 ¹⁹ , LA = 4.40 ²³)	Atlanta = 4.25 ²⁵ Minnequa = 4.50 ¹⁴
			LA = 6.00 ¹	Newark = 5.00 ²⁹ Putnam = 5.10 ²⁹ Hartford = 5.10 ⁴
	4.90 ²³	4.70 ²³	LA = 5.35 ²² F = 5.35 ¹⁹	
				{ Newark = 5.75 ²⁹ Worcester = 5.75 ² Hartford = 5.85 ⁴
			5.55 ¹¹	F = 6.60 ¹⁹ SF, S = 6.30 ²² LA = 6.25 ²²
		4.10 ²³	F = 4.30 ¹⁹ S = 4.60 ²³ Geneva = 3.70 ¹⁸	Claymont = 4.15 ²⁹ Coatesville = 4.15 ²¹ Minnequa = 4.50 ¹⁴
				Harrisburg = 5.25 ²⁸
			F = 5.70 ¹⁹ S = 6.55 ²² Geneva = 5.65 ¹⁸	Coatesville = 5.25 ²¹ Claymont = 4.85 ²⁹
			5.85 ¹¹	F = 6.25 ¹⁹ Geneva = 5.16 ¹⁶
	4.20 ²³	4.05 ²³	SF = 4.20 ²³ F = 4.25 ¹⁶ LA = 4.25 ^{24.22} S = 4.30 ²³	Geneva 3.85 ¹⁴ Minnequa 4.10 ¹⁴
			5.50 ¹¹	SF = 6.10 ^{22.19} SF = 6.00 ²² LA = 6.05 ²²
	5.40 ²³	5.25 ²³	SF, LA = 5.80 ²⁴	{ Atlanta = 5.10 ²⁸ Worcester = 5.15 ² Minnequa = 5.10 ¹⁴ Portsmouth = 5.25 ²⁰

KEY TO STEEL PRODUCERS

- U. S. Steel Co., Pittsburgh
- American Steel & Wire Co., Cleveland
- Bethlehem Steel Co., Bethlehem
- Republic Steel Corp., Cleveland
- Jones & Laughlin Steel Corp., Pittsburgh
- Youngstown Sheet & Tube Co., Youngstown
- Armco Steel Corp., Middletown, Ohio
- Inland Steel Co., Chicago
- Weirton Steel Co., Weirton, W. Va.
- National Tube Co., Pittsburgh
- Tennessee Coal, Iron & R. R. Co., Birmingham
- Great Lakes Steel Corp., Detroit
- Sharon Steel Corp., Sharon, Pa.
- Colorado Fuel & Iron Corp., Denver
- Wheeling Steel Corp., Wheeling, W. Va.
- Geneva Steel Co., Salt Lake City
- Crucible Steel Co. of America, New York
- Pittsburgh Steel Co., Pittsburgh
- Kaiser Steel Corp., Oakland, Calif.
- Portsmouth Div., Detroit Steel Corp., Detroit
- Lukens Steel Co., Coatesville, Pa.
- Granite City Steel Co., Granite City, Ill.
- Wisconsin Steel Co., South Chicago, Ill.
- Columbia Steel Co., San Francisco
- Copperweld Steel Co., Glassport, Pa.
- Alan Wood Steel Co., Conshohocken, Pa.
- Calif. Cold Rolled Steel Corp., Los Angeles
- Allegheny Ludlum Steel Corp., Pittsburgh
- Worth Steel Co., Claymont, Del.
- Continental Steel Corp., Kokomo, Ind.
- Rotary Electric Steel Co., Detroit
- Laclede Steel Co., St. Louis
- Northwestern Steel & Wire Co., Sterling, Ill.
- Keystone Steel & Wire Co., Peoria, Ill.
- Central Steel & Wire Co., Harrisburg, Pa.
- Carpenter Steel Co., Reading, Pa.
- Eastern Stainless Steel Corp., Baltimore
- Washington Steel Corp., Washington, Pa.
- Jessop Steel Co., Washington, Pa.
- Blair Strip Steel Co., New Castle, Pa.
- Superior Steel Corp., Carnegie, Pa.
- Timken Steel & Tube Div., Canton, Ohio
- Babcock & Wilcox Tube Co., Beaver Falls, Pa.
- Reeves Steel & Mfg. Co., Dover, Ohio
- John A. Roebling's Sons Co., Trenton, N. J.
- Simonds Saw & Steel Co., Fitchburg, Mass.
- McLouth Steel Corp., Detroit
- Cold Metal Products Co., Youngstown
- Thomas Steel Co., Warren, Ohio
- Wilson Steel & Wire Co., Chicago
- Sweet's Steel Co., Williamsport, Pa.
- Superior Drawn Steel Co., Monaca, Pa.
- Tremont Nail Co., Wareham, Mass.
- Firth Sterling St. & Carbide Corp., McKeesport
- Ingersoll Steel Div., Chicago
- Phoenix Iron & Steel Co., Phoenixville, Pa.
- Fitzsimons Steel Co., Youngstown
- Stanley Works, New Britain, Conn.
- Universal-Cyclops Steel Corp., Bridgeville, Pa.
- American Cladmetals Co., Carnegie, Pa.
- Cuyahoga Steel & Wire Co., Cleveland
- Bethlehem Pacific Coast Steel Corp., San Fran.
- Follansbee Steel Corp., Pittsburgh
- Niles Rolling Mill Co., Niles, Ohio
- Atlantic Steel Co., Atlanta
- Acme Steel Co., Chicago
- Joslyn Mfg. & Supply Co., Chicago
- Detroit Steel Corp., Detroit
- Wycoff Steel Co., Pittsburgh
- Bliss & Laughlin, Inc., Harvey, Ill.
- Columbia Steel & Shifting Co., Pittsburgh
- Cumberland Steel Co., Cumberland, Md.
- La Salle Steel Co., Chicago
- Monarch Steel Co., Inc., Hammond, Ind.
- Empire Steel Co., Mansfield, Ohio
- Mahoning Valley Steel Co., Niles, Ohio
- Oliver Iron & Steel Co., Pittsburgh
- Pittsburgh Screw & Bolt Co., Pittsburgh
- Standard Forging Corp., Chicago
- Driver Harris Co., Harrison, N. J.
- Detroit Tube & Steel Div., Detroit
- Reliance Div., Eaton Mfg. Co., Massillon, Ohio
- Sheffield Steel Corp., Kansas City
- Plymouth Steel Co., Detroit
- Wickwire Spencer Steel, Buffalo
- Angell Nail and Chaplet, Cleveland
- Mid-States Steel & Wire, Crawfordsville, Ind.
- National Supply, Pittsburgh, Pa.
- Wheatland Tube Co., Wheatland, Pa.
- Mercer Tube & Mfg. Co., Sharon, Pa.
- Woodward Iron Co., Woodward, Ala.
- Sloss-Sheffield Steel & Iron Co., Birmingham
- Hanna Furnace Corp., Detroit
- Interlake Iron Corp., Cleveland
- Lone Star Steel Co., Dallas
- Mystic Iron Works, Everett, Mass.
- Jackson Iron & Steel Co., Jackson, O.
- Globe Iron Co., Jackson, O.
- Pittsburgh Coke & Chemical Co., Pittsburgh
- Shenango Furnace Co., Pittsburgh
- Tennessee Products & Chem. Corp., Nashville
- Koppers Co., Inc., Granite City, Ill.
- Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
- Wallingford Steel Co., Wallingford, Conn.

STAINLESS STEELS

Base price, cents per lb., f. o. b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingot, re-rolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets re-rolling	16.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wire, structural	31.25	31.25	33.75	32.75	48.75	36.75	41.25	26.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	58.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.90	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢); 39; Baltimore, 27; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.
Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Lechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7.
Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.
Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 23; Monessen, 103.
Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.
Plates: Brackenridge, Pa., 28 (type 416 add 1/2¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.
Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.
Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15 1/2 gal.	Fence Posts	Single Loop Bale Ties	Twisted Barbed Wire	Gal. Barbed Wire	Merch. Wire	Wire Ann'd.	Merch. Wire (1)
Alabama City-4	118	128	123	136	140	140	5.70	5.95	
Alquippa, Pa.-5	118	132	126	136	140	140	5.70	6.15	
Atlanta-85	121	133	126	126	143	143	5.95	6.40	
Bartonsville-34	118	138	140	123	143	143	5.95	6.15	
Buffalo-85	125						4.85		
Cleveland-86	125						5.70	6.15	
Crawfordsville-87	132						5.95	6.40	
Donora, Pa.-2	118	130	123	140	140	140	5.70	6.15	
Duluth-2	118	130	123	140	140	140	5.70	6.15	
Fairfield, Ala.-11	126	138	123	136	140	140	5.70	6.15	
Houston-83	118	130	123	140	140	140	5.70	6.15	
Johnstown, Pa.-3	118	130	123	140	140	140	5.70	6.15	
Joliet, Ill.-2	118	130	123	140	140	140	5.70	6.15	
Kokomo, Ind.-30	120	132	126	138	140	140	5.80	6.05	
Los Angeles-82	130	130	142	135	152	152	6.30	6.75	
Kansas City-83	123	138	130	126	146	146	5.95	6.45	
Minneapolis-18	124	133			145	145	5.95	6.40	
Moline, Ill.-4	136								
Palmer-88	137	149	147	156	160	160	6.65	6.80	
Pittsburg, Cal.-24	124	137			147	147	6.10	6.60	
Portsmouth-20	118	130			140	140	5.70	6.15	
Rankin, Pa.-2	118	126	140	123	136	136	5.70	5.95	
So. Chicago, Ill.-4	120				142	142	5.80	6.25	
S. San Fran.-14	118	130	140	123	140	140	5.70	6.15	
Sparrows Pt.-3	120				142	142	5.80	6.25	
Sterling, Ill.-33	118	130	140	123	140	140	5.70	6.15	
Struthers, Ohio-6	138						5.70	6.15	
Terrace, Cal.-24	124						6.65		
Worcester-2	124						6.00	6.45	
Williamsport, Pa.-51	180								

Cut Nails, carloads, base, \$6.75 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa., (26), Wareham, Mass. (53), Wheeling, W. Va., (15).
(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

Per Net Ton
6 to 24-in., del'd Chicago, \$105.30 to \$108.80
6 to 24-in., del'd N. Y., 108.50 to 109.50
6 to 24-in., Birmingham, 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less \$108.50 to \$113.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about \$200 per net ton.

BUTTWELD												SEAMLESS					
1/2 in.	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.	2 1/2 in.	3 in.	3 1/2 in.	4 in.	4 1/2 in.	5 in.	2 in.	2 1/2 in.	3 in.	3 1/2 in.	4 in.	4 1/2 in.
Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.
STANDARD T. & C.																	
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0			
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0			
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0			
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0			
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0			
Pittsburgh-86	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	32.5	34.0
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0			
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5			
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5
EXTRA STRONG, PLAIN ENDS																	
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0			
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0			
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0			
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0			
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0			
Pittsburgh-86	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	33.0	36.0
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0			
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5			
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0

Galvanized discounts based on zinc at 17¢ per lb., East St. Louis. For each 1¢ change in zinc, discounts vary as follows: 1/2 in., 3/4 in., and 1 in., 1 pt.; 1 1/4 in., 1 1/2 in., 2 in., 3/4 pt.; 2 1/2 in., 3 in., 1/2 pt. Calculate discounts on even cents per lb. of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb., use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, butt-weld and seamless, 1 pt. higher discount. Plain ends, butt-weld and seamless, 3 in. and under, 3/4 pt. higher discount. Butt-weld jobbers' discount, 5 pt.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb.	No. 1 Std. Rail	Light Rail	Joint Bars	Track Spikes	Arise	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			6.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.25	8.60	4.50	
Johnstown-3		4.00			5.60	6.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				0.85
Lackawanna-3	3.60	4.00	4.70			6.60	4.50	
Lebanon-3				6.15				0.85
Milwaukee-14	3.60	4.50	4.70	6.15		6.60	4.50	0.85
Pittsburgh-77						9.35		0.85
Pittsburgh-78								0.85
Pittsburgh-5				6.15				
Pittsburg-24								4.65
Seattle-62				6.10				4.35
Steeltown-3	3.60		4.70					4.50
Struthers-6				6.15				
Torrance-24								4.65
Youngstown-4				6.15				

BOILER TUBES

Seamless steel, electric welded commercial boiler tubes, locomotive tubes, minimum wall, per 100 ft at mill, c.i. lots, cut lengths 10 to 24 ft.

OD gage		Seamless		Electric	Weld
in in.	BWG	H.R.	C.D.	H.R.	C.D.
2	13	\$22.67	\$26.66	\$21.99	\$25.86
2 1/2	12	30.48	35.84	29.57	34.76
3	12	33.90	39.90	32.89	38.70
3 1/2	11	42.37	49.89	41.10	48.39
4	10	52.60	61.88	51.03	60.63

Pittsburgh Steel add, H-R: 2 in., 6¢; 2 1/2 in., 8¢; 3 in., 9¢; 3 1/2 in., \$1.17; 4 in., \$1.45. Add, C-R: 2 in., 7¢; 2 1/2 in., 9¢; 3 in., \$1.10; 3 1/2 in., \$1.37; 4 in., \$1.70.

FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill. Base price, net ton: Effective CaF₂ content:
70% or more \$43.00
60% or less 40.00

Base price, f.o.b., dollars per 100 lb. * (Metropolitan area delivery, add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

WAREHOUSES

Cities	Sheets			Strip		Plate Shapes		Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (16 gage)	Galvanized (16 gage)	Hot-Rolled	Cold-Rolled	Standard	Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49 ²	6.04	.....	5.80	6.14	6.04	6.84	10.24	10.54	11.69	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00	7.74	6.15	8.50 ⁴	6.48	6.28	6.05	6.79	10.25	10.55	11.90	12.20
Buffalo	5.60	6.40	7.74	5.86	.....	6.78	.....	5.60	6.84	10.15	10.45	11.80	12.30
Chicago	5.60	6.40	7.75	5.55	.....	6.05	5.80	5.60	6.40	10.15	10.45	11.80	12.10
Cincinnati*	5.67	6.44	7.39	5.80	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cleveland	5.60	6.40	8.10	5.69	8.90	5.92	5.82	5.67	6.40	9.91	10.21	11.56	12.10
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd.	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45 ⁴	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33	7.06	.....	6.33	.....	6.43	6.33	6.08	7.16	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.80	.....	6.02	6.48	6.33	7.32	.....	.....	.....	.....
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67	7.19 ²	8.14 ²	6.29	8.63 ⁴	6.28	6.10	6.12	8.99	10.05	10.35	11.70	12.10
Norfolk	5.97	7.24 ¹	.....	6.89	.....	6.58	.....	6.53	.....	10.15	10.45	11.80	12.20
Philadelphia*	6.50 ³	.....	.....	.....	.....	6.50 ³	6.60 ³	6.55 ³	.....	.....	.....	.....	.....
Pittsburgh	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	9.90	10.20	.....	.....	.....
Portland	5.60	6.40	7.75	5.85	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60	8.95	8.50	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.55	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco*	7.95	.....	9.70	8.70	.....	8.05	6.75	7.95	9.00	.....	.....	.....	.....
Seattle	.....	.....	10.50 ²	8.75	.....	8.30	8.65	.....	.....	.....	.....	.....	.....
St. Louis	6.65	8.05 ²	8.55	6.60	8.45 ⁴	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.50
St. Paul*	7.05	8.60	8.90 ²	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Paul*	5.80	6.65	8.00	5.80	8.00 ⁴	6.13	6.03	5.80	6.55	10.05	10.35	11.70	12.00
St. Paul*	5.85	.....	.....	.....	8.28	.....	.....	.....	6.65	.....	.....	.....	.....
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	8.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 9999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-53	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Dallingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	53.25	53.75	.....	.....	.....	.....	.....
Fenton-19	50.00	50.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, O.-8	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, O.-97.98	.....	.....	.....	.....	82.50	.....	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Menomon-19	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 35¢ per ton for phosphorus content over 0.70 pct. Silvery iron: Add \$1.50 per ton for each 0.50 pct silicon over base (0.01 to 0.50 pct) up to 17 pct, \$1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferroalloy prices are \$1 over comparable silvery iron.

REFRACTORIES

(F.o.b. works)

Fire Clay Brick Carloads, Per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5) \$94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 79.20
No. 2 Ohio 13.75
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. \$94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Chester \$32.00

Magnesite Brick

Standard, Baltimore \$104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite

St. %-in. grains

Domestic, f.o.b. Baltimore, in bulk fines removed \$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ \$13.00

COKE

Furnace, beehive (f.o.b. oven) Net Ton
Connellsville, Pa. \$14.00 to \$14.50
Foundry, beehive (f.o.b. oven)
Connellsville, Pa. \$17.00 to \$17.50
Foundry, oven coke
Buffalo, del'd \$26.69
Chicago, f.o.b. 23.00
Detroit, f.o.b. 24.00
New England, del'd 24.80
Seaboard, N. J., f.o.b. 22.00
Philadelphia, f.o.b. 22.70
Swedeland, Pa., f.o.b. 22.60
Painesville, Ohio, f.o.b. 24.00
Erie, Pa., f.o.b. 23.50
Cleveland, del'd 25.72
Cincinnati, del'd 25.06
St. Paul, f.o.b. 22.50
St. Louis, 25.40
Birmingham, del'd 21.69
Neville Island 23.00

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

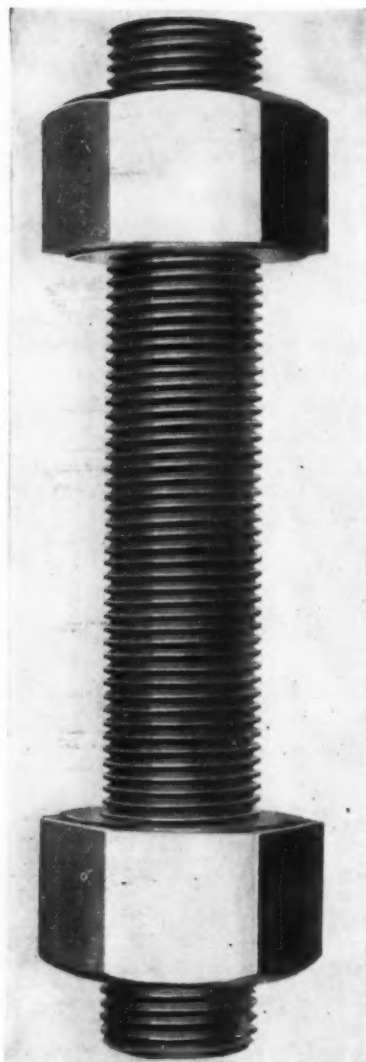
Per gross ton

Old range, bessemer \$8.70
Old range, nonbessemer 8.55
Mesabi, bessemer 8.45
Mesabi, nonbessemer 8.30
High phosphorus 8.30
After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon 5.35¢
0.41 to 0.60 carbon 6.80¢
0.61 to 0.80 carbon 7.40¢
0.81 to 1.05 carbon 9.35¢
1.06 to 1.35 carbon 11.65¢
Worcester, add 0.30¢; Sharon, Carnegie, New Castle, add 0.35¢; Detroit, 0.26 to 0.40 carb., add 25¢; other grades add 15¢.
New Haven, 0.26 to 0.40 carb., add 50¢; other grades add 5¢.



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Special BOLTS
and STUDS**

Send your Specifications to

ERIE

37 years' experience in
making special bolts, studs,
nuts for specific job
requirements.



REPRESENTATION IN PRINCIPAL CITIES

IRON AGE — MARKETS & PRICES

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List	
	Less Case C.	
1/2 in. & smaller x 6 in. & shorter	15	28 1/2
9/16 in. & 5/8 in. x 6 in. & shorter	18 1/2	30 1/2
3/4 in. & larger x 6 in. & shorter	17 1/2	29 1/2
All diam. longer than 6 in.	14	27 1/2
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List	
	Less Keg K. (Reg.)	Less Keg K. (Hvy.)
1/2 in. & smaller	15	28 1/2
9/16 in. & 5/8 in.	12	25
3/4 in. to 1 1/2 in.	9	23
Inclusive	7 1/2	22
1 in. & larger	7 1/2	22

Nuts, Hot Pressed—Hexagon

1/2 in. & smaller	26	37	22	34
9/16 in. & 5/8 in.	16 1/2	29 1/2	6 1/2	21
3/4 in. to 1 1/2 in.	12	25	2	17 1/2
Inclusive	8 1/2	23	2	17 1/2

Nuts, Cold Punched—Hexagon

1/2 in. & smaller	26	37	22	34
9/16 in. & 5/8 in.	23	35	17 1/2	30 1/2
3/4 in. to 1 1/2 in.	19 1/2	31 1/2	12	25
Inclusive	12	25	6 1/2	21

Nuts, Semi-Finished—Hexagon

	Reg.	Hvy.
1/2 in. & smaller	35	45
9/16 in. & 5/8 in.	29 1/2	40 1/2
3/4 in. to 1 1/2 in.	24	36
Inclusive	24	36
1 in. & larger	13	26

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter. 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.
**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb.
1/2 in. & larger	\$7.85
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

	Pct Off List
Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 1/2 in. x 6 in., SAE 1020, bright	54
3/4 in. thru 1 in. up to & including 6 in.	48
1/2 in. thru 1/2 in. x 6 in. & shorter high C double heat treat	46
3/4 in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-64% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C	27.75
Ton lots	30.05
Less ton lots	31.85

ELECTRODES

Cents per lb., f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
GRAPHITE		
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2 1/2	24, 30	23.15
2	24, 30	25.36
CARBON		
40	100, 110	8.02
35	65, 110	8.02
30	65, 84, 110	8.02
24	72 to 104	8.02
20	84, 90	8.02
17	60, 72	8.02
14	60, 72	8.67
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)...	29.5	
Washgtn, Pa. (39)....	29.5	
Claymont, Del. (29)....	28.00	
Conshohocken, Pa. (26)		24.00
New Castle, Ind. (55)...	26.50	23.50
Nickel-carbon		
10 pct Coatesville (21)...	32.5	
Inconel-carbon		
10 pct Coatesville (21)...	40.5	
Monel-carbon		
10 pct Coatesville (21)...	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)....		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill					Has
W	Cr	V	Mo	Co	per lb
18	4	1	—	—	\$1.235
18	4	1	—	5	\$1.86
18	4	2	—	—	\$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	.87¢
High-carbon chromium 63.5¢					
Oil hardened manganese 32.25¢					
Special carbon 2¢					
Extra carbon 2¢					
Regular carbon 2¢					
Warehouse prices on and east of Mississippi are 3¢ per lb higher. West Mississippi, 5¢ higher.					

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f.	7.4¢ to 9.0¢
New York, ocean bags...	
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+%	9.0¢ to 15.0¢
Fe, carload lots	
Electrolytic iron, annealed, 99.5+%	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+%	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+%	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+%	70.0¢ to \$1.35
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic, 10.25¢ plus metal value	
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	\$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	\$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	\$1.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	\$4.15
Zinc, 10 ton lots	20.50¢ to 23.85¢

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.R.B. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom-15	7.25	8.50	9.30	9.85	10.40	11.10	
Brackenridge-28	7.25	8.50	9.30	9.85	10.40	11.10	
Fallanshee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	7.95	9.20					
Ind. Harbor-3	6.75	7.25					
Mansfield-75	7.25	7.75	9.00	9.80			
Niles, O.-64	7.05	7.55					
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Transformer 52, 60¢ above Transformer 50.

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C	\$1.09
0.50% max. C	1.05
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si. Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.	
Carloads	19.00
Ton lots	22.10
Less ton lots	23.00

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 60.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, 1/2 in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

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your assurance of longer wire rope life!



-Preformed-
"HERCULES"
RED-STRAND
WIRE ROPE

REG U.S. PAT. OFF.

Every wire that goes into "HERCULES" (Red-Strand) Wire Rope is first thoroughly tested in our Engineering Laboratory. Uniformity and safety, toughness and efficiency are thereby pre-determined to assure you of longer wire rope life!

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ESTABLISHED 1857

New York 6
Chicago 7
Birmingham 6
Houston 3
Denver 2
Los Angeles 21
San Francisco 7
Portland 9
Seattle 4

FUMES and HEAT present NO Operational Problems



with this
**AIR CONDITIONED
EUCLID CRANE**

Designed and equipped especially for efficient operation over furnaces or other equipment and machinery where high temperatures and noxious fumes are present. An air-conditioning unit removes dust, cools the air and neutralizes fumes with activated carbon filters. Other special features include: slip ring motors with glass insulation and thermo guards; protective baffle plate under trolley and thermo pane windows.

Write for complete information and specifications.



THE EUCLID CRANE & HOIST CO.

1361 CHARDON ROAD • EUCLID, OHIO



Side view of cab showing air-conditioning unit mounted above on catwalk.

Heavy Industries Use

KRANE KAIR

SWING-BOOM MOBILE CRANE

to Cut Costs by Handling Loads Easier, Faster, Safer



Stacking fittings at a Los Angeles Public Utility



Unloading boxcar at Southern Pacific's General Stores Dept.



Handles tubes and heavy equipment at the Wilmington Refinery of the Union Oil Company

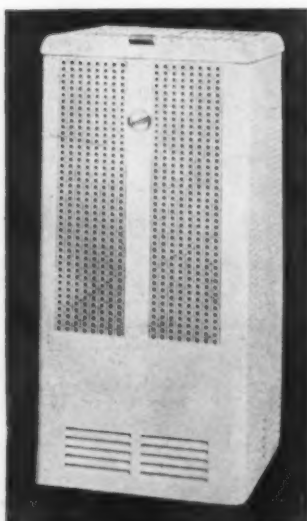
Gas or diesel, 12 to 37 ft. booms, or adjustable telescopic booms; solid or pneumatic rubber-tires. 1½, 2½, 5, and 10 ton cap. Buckets, magnets, all-weather or foldable tops, and other accessories available.

WRITE FOR BULLETIN NO. 79

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

Hendrick Ornametal

TRADE MARK



Hendrick Ornamental is a decorative, lightweight metal grille suitable for a wide variety of applications, such as for stove panels as shown in the illustration.

Furnished in a wide variety of attractive designs, Ornamental is made of a special bright finish, cold rolled steel, suitable for painting or plating, and is available in a wide range of stock size sheets and gauges. Write for full information.



Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

HENDRICK

Manufacturing Company

37 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

IRON AGE MARKETS & PRICES

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract basis price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O. \$185
F.o.b. Johnstown, Pa. \$187
F.o.b. Sheridan, Pa. \$187
F.o.b. Etta, Clairton, Pa. \$184
\$2.00 for each 1% above 82% Mn.
penalty, \$2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet delivered, 66% contained Mn.
Carload, bulk 10.55
Ton lots 12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Palmerton, Pa. \$74.00 \$75.00
Pgh. or Chicago 74.00 75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, packed 23.75
Ton lots 31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 21
Ton lots 20
Less ton lots 21

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn. 19.15

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.
Cast Turnings Distilled
Ton lots \$2.05 \$2.95 \$3.75
Less ton lots 2.40 3.30 4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C deduct 0.2¢.
Carload bulk 9.90
Ton lots 11.50
Briquet, contract basis carlots, bulk delivered, per lb of briquet 11.15
Ton lots 11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$92.50 gross ton, freight allowed to normal trade area, Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$83.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe 21.75
97% Si, 1% Fe 22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.55
Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.
25% Si 19.00 75% Si 14.00
50% Si 12.40 85% Si 15.50
90-95% Si 17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd, Mn 85-90%.
Carloads Ton Less
0.7% max. C, 0.06% P, 90% Mn 26.25 23.10 29.50
0.07% max. C 25.75 27.60 28.50
0.15% max. C 25.25 27.10 28.00
0.30% max. C 24.75 26.60 27.50
0.50% max. C 24.25 26.10 27.00
0.75% max. C, 7.00% max. Si 21.25 23.10 24.50

IRON AGE MARKETS & PRICES

Other Ferroalloys

Alsilfer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	9.90¢
Carload	11.30¢
Ton lots	
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo.	\$1.15
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	\$4.90
Ton lots	4.95
Less ton lots	
Ferro-Tantalum - columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	\$3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	\$1.32
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.35
Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.50
Less ton lots	\$1.55
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	\$177.00
Ferrotungsten, standard, lump or 3/4 x down, packed, per pound contained W, 5 ton lots, delivered	\$3.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	\$3.00-\$3.05
Crucible	3.10-3.15
High speed steel (Primors)	3.25
Molybde oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	\$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	\$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium pentoxide, 88-92% V ₂ O ₅ , contract basis, per pound contained V ₂ O ₅	\$1.28
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
carload, bulk	7.00¢

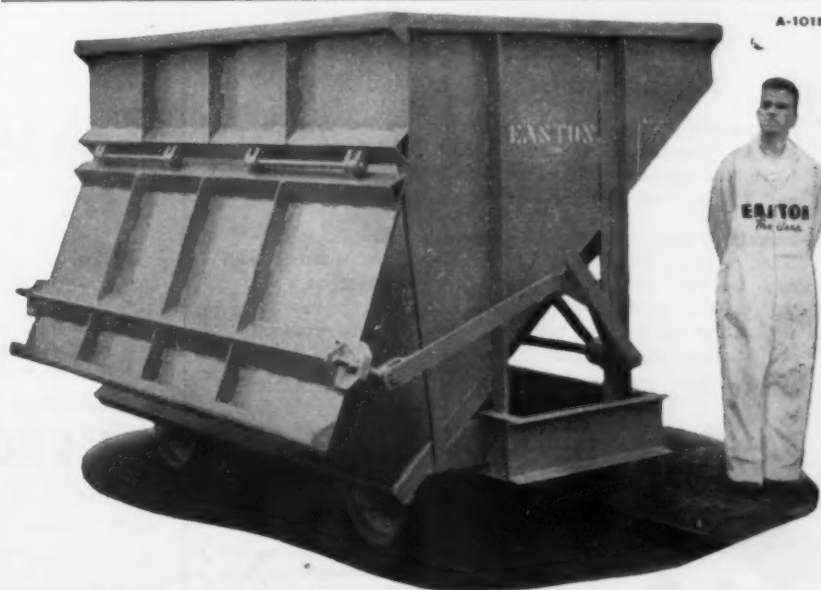
Boron Agents

Contract prices per lb of alloy, del.	
Borasil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$5.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	\$1.20
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	\$1.00
No. 6	65¢
No. 79	50¢
Manganese-Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	\$1.46
Less ton lots	1.57
Nickel-Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silicax, contract basis, delivered.	
Ton lots	45.00¢

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**Saved up to \$11 per man
per week and removed a
safety hazard**

Edmont

CASE NO. 217



Problem: In electroplating wire products in 120° to 180° chromic acid solutions, expensive unlined rubber gloves proved costly and hazardous because of snagging. Medium weight neoprene coated gloves with fabric base resisted snagging but workmen wore out 2 to 3 pairs per day, costing \$8 to \$12 per man per week.

Solution: Edmont-recommended gloves of extra heavy duty NEOX (reinforced neoprene) over fabric base, giving 4 to 5 days' service at cost of only \$1 to \$1.25 per man per week. Employees greatly prefer this lined glove because it absorbs sweat, is easy to slip off and gives best protection against tearing and flooding with acid. (Full job details on request.)

**THERE IS A "CORRECT" GLOVE FOR YOUR
OPERATION. LET US HELP YOU FIND IT.**

As world's largest maker of coated-fabric industrial gloves, Edmont offers a complete line of NEOX (reinforced neoprene), natural rubber and plastic coatings and data on their comparative suitability for your work.

Make This Free Test: Send us, on your business letter-head, a brief description of your operation, materials handled and temperature condition. Without cost we will forward samples of the type gloves we recommend, for on-the-job test and report. The cost-saving revealed will surprise you. Address

Edmont Mfg. Co., 553 Orange St., Coshocton, Ohio



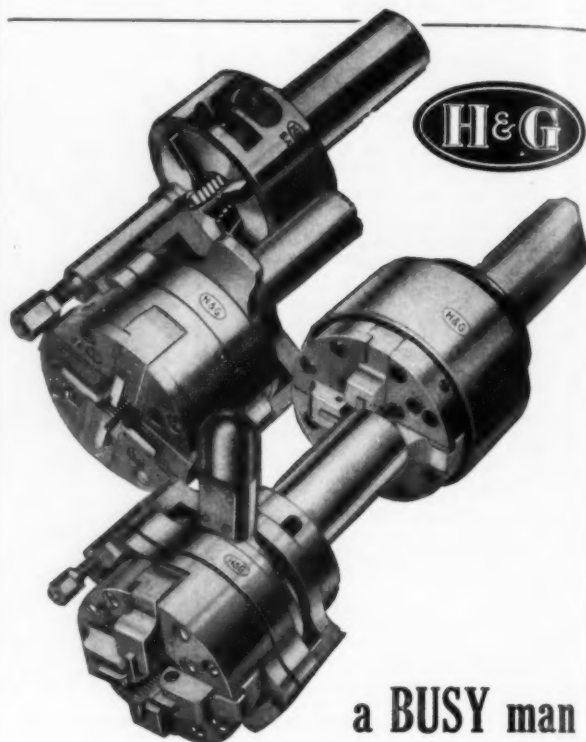
Better Designed for Working Hands: Note one-piece, seamless wearing surface—no thumb seam to tear, no edges to rub. Note unusually wide thumb span and shaped palm and fingers which give maximum working freedom. This "Redmont" glove has extra heavy duty coating of NEOX (neoprene greatly toughened by special additives). Six styles, from knitted wrist to elbow-length gauntlet.

Flexible Weight NEOX and Plastic Coatings: Many types to fit different operations.

Grab-It Safety Grip Gloves: Rough textured natural rubber coating, overall or on palm and thumb only, outwears higher-priced leather, outwears canvas 5 to 10 times and grips firmly wet or dry. Knitted wrist, safety cuff or gauntlet.

MANAGEMENT: It pays to promote the use of better work gloves—for greater safety and productivity as well as substantial cost-savings to your company or to employees who buy their own.

**It makes a difference whether
the man or the machine is busy**



**a BUSY man
at an IDLE Automatic
spells LOSS
an IDLE man
at a BUSY Automatic
spells PROFIT**

H & G INSERT CHASER DIE HEADS

are mechanically right, functioning flawlessly at high speeds for hours on end. They minimize down time, gaining as much as an hour a day in net production.

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